

ACC 2015 Core Cardiovascular Training Statement (COCATS 4) Competency Tables

Revision Date: March 13, 2015

Task Force 1, Table 1. Core Competency	Components and (Curricular Mil	lestones for 7	Fraining in Ambulatory	, Consultative,
and Longitudinal Cardiovascular Care	_				

Competency ID	Medical Knowledge	Milestones (Months)			
		12	24	36	Add
M-AMB-MK1	Know the major cardiovascular risk stratification tools and the principles of primary and secondary cardiovascular disease prevention.	Ι			
M-AMB-MK2	Know the roles of genetics and family history and the environmental and lifestyle factors in the development and clinical course of cardiovascular disease.		Ι		
М-АМВ-МКЗ	Know the effects of age on cardiovascular function, response to medications, and in the risks of diagnostic and therapeutic procedures.		Ι		
M-AMB-MK4	Know the differential diagnosis of chest pain and the distinguishing features of the various etiologies.	Ι			
M-AMB-MK5	Know the cardinal findings and differential diagnosis of palpitations, lightheadedness, and syncope, and the distinguishing features of the various etiologies.	Ι			
M-AMB-MK6	Know the cardinal findings and differential diagnosis of dyspnea.	Ι			
M-AMB-MK7	Know the differential diagnosis of peripheral edema and the distinguishing clinical features of the various etiologies.	Ι			
M-AMB-MK8	Know the roles of kidney, hepatic, pulmonary, hematologic, rheumatologic, and endocrine disorders in the development, manifestations, and responses to treatment in patients with cardiovascular disease.		Ι		
М-АМВ-МК9	Know the clinical pharmacology of cardiovascular medications, and drug- drug interactions of cardiac and noncardiac medications, including in special populations and in patients with relevant comorbidities.		Ι		
M-AMB-MK10	Know the roles of lifestyle, activity level, body mass, nutrition, alcohol and/or drug use in cardiovascular risk and disease.	Ι			
M-AMB-MK11	Know the potential cardiovascular toxicity and side effects of major classes of drugs used for the management of patients with common medical conditions, including antimicrobial agents, immune system modulators, chemotherapeutic agents, and antiParkinsonian drugs.			Ι	
M-AMB-MK12	Know the roles of stress, anxiety, and depression in patients with suspected cardiovascular disease.	Ι			
M-AMB-MK13	Know the guideline recommendations for blood pressure, blood glucose, and lipid management in diverse patient populations with and without cardiovascular disease.		Ι		
M-AMB-MK14	Know the appropriate use indications for cardiovascular screening studies, including carotid and abdominal ultrasound (or other imaging) modalities.		Ι		
M-AMB-MK15	Know the differential diagnosis and distinguishing characteristics of heart murmurs and bruits.		Ι		
M-AMB-MK16	Know the characteristic clinical manifestations, differential diagnosis, and appropriate testing for peripheral vascular disease.		Ι		
M-AMB-MK17	Know the mechanisms and cardinal symptoms and findings of stroke, transient cerebral ischemia, and dementia.		Ι		
M-AMB-MK18	Know the principles, modalities, and appropriate indications for palliative care.	Ι			
	Evaluation Tools: chart-stimulated recall, conference presentation, direct obs	servatio	on, in-ti	aining e	exam
	Patient Care and Procedural Skills	12	24	36	Add
M-AMB-PC1	Skill to effectively and efficiently perform an initial outpatient cardiovascular consultation, and establish a differential diagnosis.	Ι			
M-AMB-PC2	Skill to appropriately utilize diagnostic testing – both for initial diagnosis and for follow-up care.		Ι		
M-AMB-PC3	Skill to integrate clinical and testing results to establish diagnosis, assess cardiovascular risk, and formulate treatment and follow-up plans.		Ι		

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M-AMB-PC4	Skill to appropriately obtain and integrate consultations from other		Ι		
	healthcare professionals in a timely manner.		<u> </u>	<u> </u>	
м-амв-рс5	Skill to recognize acute cardiovascular disorders or high-risk states that		T		
	require immediate treatment and/or hospitalization, and prioritize		1		
MAMD DCC	Shill to establish an effective medical regimen and monitor for side effects.	+		<u> </u>	
WI-AWID-PC0	intolerance or noncompliance and patient safety		Ι		
M.AMB.PC7	Skill to assess the cardiovascular risks associated with recreational and/or	+	+		
	competitive sports for individual nations associated with recreational and/or				
	levels of physical activity appropriate to their cardiovascular health in the		I		
	context of disease prevention; rehabilitation; and promotion of longevity,				
	functional capacity, and quality of life.				
M-AMB-PC8	Skill to effectively carry out chronic disease management in patients with				
	chronic ischemic heart disease, hypertension, heart failure, and peripheral		Ι		
	vascular disease.				
M-AMB-PC9	Skill to coordinate ambulatory and longitudinal follow-up care.			I	
M-AMB-PC10	Skill to effectively facilitate transition of care from hospital to ambulatory		Т		
	or intermediate care settings.		-		
M-AMB-PC11	Skill to perform preoperative assessments for noncardiac procedures in	т			
	patients with cardiovascular disease.	1			
	Evaluation Tools: chart-stimulated recall, conference presentation, direct ob	servati	on		
	Systems-Based Practice	12	24	36	Add
M-AMB-SBP1	Effectively lead or participate in team-based care in patients with or at risk		т		
	of developing cardiovascular disease.		1		
M-AMB-SBP2	Effectively facilitate transition of care.	Ι			
M-AMB-SBP3	Effectively utilize electronic medical record systems, including clinical	T			
	protocols and treatment/evaluation prompts.		<u> </u>	<u> </u>	
M-AMB-SBP4	Effectively and appropriately use remote communication tools in the care	Ι			
MAMD CDD5	of patients.	───	<u> </u>	<u> </u>	
M-AMB-SBP5	care facilities.		Ι		
M-AMB-SBP6	Recognize and address social, cultural, and financial barriers to patient	T	1		
	compliance.	1			
	Evaluation Tools: direct observation, multisource evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-AMB-PBL1	Utilize point-of-care electronic resources to provide up-to-date clinical	т			
	information and guideline-driven evaluation and treatment.	1			
M-AMB-PBL2	Identify gaps and carry out personalized education activities to address		T		
	them.	───			
M-AMB-PBL3	Integrate validated performance and patient satisfaction measures into		Ι		
	clinical practice to foster continuous quality improvement.	16	<u> </u>		
	Evaluation Tools: chart-sumulated recall, direct observation, reflection and	sen-ass	sessmer	11	1
	Professionalism	12	24	36	Add
M-AMB-PROF1	Practice patient-centered care with shared decision-making and	Ι			
	appreciation of patients values and preferences.		<u> </u>	<u> </u>	
M-AMB-PKUF2	treatment decisions		Ι		
M_AMB_PROF3	Practice in a manner that fosters patient benefit above self interest and	-	+		
WI-ANID-I KOF5	avoids conflict of interest	Ι			
M-AMB-PROF4	Interact respectfully with patients, families, and all members of the			<u> </u>	
	healthcare team, including ancillary and support staff.	I			
	Evaluation Tools: chart-stimulated recall, direct observation, multisource ev	aluatic	n	•	•
	Internersonal and Communication Skills	12	24	36	Δdd
M-AMB-ICS1	Communicate effectively with patients and families across a broad	14			nuu
	spectrum of ethnic, social, cultural, socioeconomic, and religious	Ι			
	backgrounds.				
M-AMB-ICS2	Exhibit sensitivity and empathy in dealing with life-threatening and end-	Ι			

	of-life issues.		
M-AMB-ICS3	Communicate effectively and in a timely manner with primary care and other referring or collaborating members of the healthcare team.	Ι	
	Evaluation Tools: direct observation, multisource evaluation		

Task Force 1, Table 2. Core Competency Components and Curricular Milestones for Training in Stable Ischemic Heart Disease

	Medical Knowledge	Milestones (Months			ths)
	8	12	24	36	Add
M-ISCHEM-MK1	Know the epidemiology, pathophysiology, and natural history of atherosclerotic vascular disease and the characteristic features of stable and unstable coronary artery plaque.	Ι			
M-ISCHEM-MK2	Know the determinants of coronary blood flow and myocardial oxygen consumption.	Ι			
M-ISCHEM-MK3	Know the differential diagnosis of chest pain syndromes and the characteristic clinical features of typical angina, atypical angina, and noncardiac chest pain.	Ι			
M-ISCHEM-MK4	Know the clinical features and natural history of angina pectoris in special populations: women, the elderly, and patients with diabetes.	Ι			
M-ISCHEM-MK5	Know the causes of angina pectoris not related to atherosclerotic coronary disease (including valvular heart disease, hypertrophic cardiomyopathy, cocaine, congenital coronary anomalies, vasculitis, and coronary artery spasm).	Ι			
M-ISCHEM-MK6	Know the medical conditions that can provoke or exacerbate angina pectoris.	Ι			
M-ISCHEM-MK7	Know the differential diagnosis and prognosis of myocardial ischemia in patients with nonobstructive coronary disease.	Ι			
M-ISCHEM-MK8	Know the characteristic electrocardiographic features of ischemia.	Ι			
M-ISCHEM-MK9	Know the indications, contraindications, and limitations of noninvasive testing in the context of the pre-test likelihood and predictive value for diagnosis of coronary artery disease.	Ι			
M-ISCHEM-MK10	Know the role of noninvasive testing in risk-assessment, including the clinical, functional capacity, ECG, and hemodynamic stress test findings indicative of advanced coronary disease or high-risk state.		Ι		
M-ISCHEM-MK11	Know the lifestyle, activity, and exercise guidelines and risk factor treatment targets in patients with stable ischemic heart disease.	Ι			
M-ISCHEM-MK12	Know the indications, contraindications, and the clinical pharmacology of medications used to improve symptoms and/or prognosis in patients with stable ischemic heart disease.	Ι			
M-ISCHEM-MK13	Know the role of left ventricular systolic function in clinical decision- making and in estimation of prognosis in patients with ischemia.	Ι			
M-ISCHEM-MK14	Know the indications, limitations, and risk of coronary angiography in patients with known or suspected ischemia.	Ι			
M-ISCHEM-MK15	Know the anatomic and physiologic catheterization findings indicating significant coronary artery obstruction and the coronary angiographic features indicative of a high-risk state.	Ι			
M-ISCHEM-MK16	Know the indications, risks, and benefits of percutaneous or surgical revascularization versus medical therapy in patients with stable ischemic heart disease.		Ι		
M-ISCHEM-MK17	Know the treatment options for refractory symptomatic stable ischemic heart disease.		Ι		
M-ISCHEM-MK18	Know the indications for noninvasive or invasive evaluation following revascularization procedures.	Ι			
	Evaluation Tools: direct observation, in-training exam				
	Patient Care and Procedural Skills	12	24	36	Add
M-ISCHEM-PC1	Skill to obtain and utilize history, physical examination, and ECG findings in patients with chest pain syndromes to establish a clinical probability of the presence of symptomatic coronary artery disease.	Ι			
M-ISCHEM-PC2	Skill to distinguish stable versus unstable coronary syndromes.	Ι			
M-ISCHEM-PC3	Skill to select evidence-based and cost-effective noninvasive testing for diagnosis and/or risk assessment in patients with chest pain syndromes.	Ι			
M-ISCHEM-PC4	Skill to interpret and apply results of noninvasive testing in the management of patients with stable ischemic heart disease.		Ι		
M-ISCHEM-PC5	Skill to perform and interpret exercise electrocardiographic testing	İ	T		1

M-ISCHEM-PC6	Skill to establish an effective anti-ischemic medical regimen for patients	Ι			
	with ischemia.				
M-ISCHEM-PC7	Skill to identify appropriate candidates for coronary angiography and		Ι		
	percutaneous or surgical revascularization.				
M-ISCHEM-PC8	Skill to interpret and integrate diagnostic cardiac catheterization findings		Ι		
	into patient management.				
M-ISCHEM-PC9	Skill to implement lifestyle, physical activity guidelines, and				
	pharmacologic interventions to safely control and achieve target levels of	Ι			
	risk factors.				
M-ISCHEM-PC10	Skill to perform preoperative risk assessment in cardiovascular patients	Т			
	undergoing noncardiac surgery.	1			
M-ISCHEM-PC11	Skill to perform diagnostic cardiac catheterization.			II	
	Evaluation Tools: chart-stimulated recall, conference presentation, direct of	oservatio	on, logl	ook	-
	Systems-Based Practice	12	24	36	Add
M-ISCHEM-SBP1	Incorporate risk-benefit analysis and cost considerations in treatment		т		
	decisions.		1		
M-ISCHEM-SBP2	Utilize a multidisciplinary coordinated approach for patient management,		т		
	including transfer of care and employment-related issues.		1		
	Evaluation Tools: chart-stimulated recall, conference presentation, direct of	oservatio	on, mul	tisource	2
	evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-ISCHEM-PBL1	Utilize decision and support tools for accessing guidelines and	т			
	pharmacologic information at the point of care.	1			
M-ISCHEM-PBL2	Identify competency gaps and engage in opportunities to achieve focused		т		
	education and performance improvement.		1		
	Evaluation Tools: conference presentation, direct observation, in-training e	xam			
	Professionalism	12	24	36	Add
M-ISCHEM-PROF1	Exhibit sensitivity to patient preference and end-of-life issues.		Ι		
M-ISCHEM-PROF2	Identify and manage conflicts of interest.		Ι		
M-ISCHEM-PROF3	Practice within the scope of personal expertise or technical skills.		Ι		
	Evaluation Tools: chart-stimulated recall, direct observation, multisource e	valuatio	n, refle	ction an	d self-
	assessment				
	Internersonal and Communication Skills	12	24	36	Add
	Interpersonal and Communication Skins				1
M-ISCHEM-ICS1	Communicate with and educate patients and families across a broad range		Ι		
M-ISCHEM-ICS1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.		Ι		
M-ISCHEM-ICS1 M-ISCHEM-ICS2	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Engage in shared decision-making with patients about their condition and		I		
M-ISCHEM-ICS1 M-ISCHEM-ICS2	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Engage in shared decision-making with patients about their condition and the options for diagnosis and treatment.		I I		
M-ISCHEM-ICS1 M-ISCHEM-ICS2	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Engage in shared decision-making with patients about their condition and the options for diagnosis and treatment. Evaluation Tools: direct observation, multisource evaluation		I I		

Task Force 1, Table 3. Core Competency Components and Curricular Milestones for Training in Acute Coronary Syndromes

	Medical Knowledge	Milestones (Months)			ths)
		12	24	36	Add
M-ACS-MK1	Know the epidemiology, causes, pathophysiology, and natural history of ACS, including the roles of plaque rupture or erosion and platelet activation and thrombosis.	Ι			
M-ACS-MK2	Know the disorders that can simulate or mask acute coronary syndromes.	I			
M-ACS-MK3	Know the risk-assessment tools in acute coronary syndromes.	I			
M-ACS-MK4	Know the indications and clinical pharmacology of antiplatelet	-			
	anticoagulant and other pharmacologic therapies	Ι			
M-ACS-MK5	Know the post-acute coronary syndromes risk assessment rehabilitation				
	and secondary prevention measures.	I			
	ST Elevation Myocardial Infarction:				
M-ACS-MK6	Know the characteristic symptoms, physical findings, electrocardiographic				
	natterns, and biomarker findings.	Ι			
M-ACS-MK7	Know the effects and time course of ischemic injury on ventricular				
	function and remodeling	Ι			
M-ACS-MK8	Know the characteristic hemodynamic complications (including				
	hypotension low cardiac output heart failure and shock)		I		
M-ACS-MK9	Know the characteristic arrhythmia and conduction complications		T		
M-ACS-MK10	Know the characteristic mechanical complications (including papillary		1		
	muscle rupture and myocardial rupture)		Ι		
M-ACS-MK11	Know the characteristic findings and complications of right ventricular				
	infarction		Ι		
M-ACS-MK12	Know indications contraindications and risks of reperfusion therapies				
	and the clinical electrocardiographic and angiographic signs of	T			
	reperfusion	1			
M-ACS-MK13	Know the relative benefits and risks of fibrinolysis and primary				
	percutaneous coronary intervention as an initial reperfusion strategy	Ι			
M-ACS-MK14	Know the indications for transfer angiography and revascularization in				
	nations who did not receive primary percutaneous coronary intervention				
	(including those who received fibrinolysis or did not receive initial		I		
	reperfusion therapy).				
	Non–ST-Elevation Acute Coronary Syndromes:				
M-ACS-MK15	Know the differential diagnosis and the characteristic clinical.		1		
	electrocardiographic, and biomarker features for diagnosis and risk		I		
	stratification.		-		
M-ACS-MK16	Know the relative risks and benefits of an initial invasive versus an				
	ischemia-guided strategy for angiography and revascularization.		I		
	Evaluation Tools: chart-stimulated recall conference presentation direct of	servati	n in_t	raining	exam
	Patient Care and Procedural Skills	12	24	26	Add
MACE DC1	Still to a latent director it. ST all stimmer tid	14	24	30	Auu
M-ACS-PCI	Skill to evaluate and diagnose patients with S1-elevation myocardial	т			
	time limite	1			
MACS DC2	Chill to appropriate antipletalet antigeographent and other				
M-ACS-PC2	skin to employ appropriate antiplatelet, anticoagurant, and other	Ι			
MACS DC3	Shill to recognize and treat homodynamic disturbances (including		ł – –		
M-ACS-FCS	by b		т		
	and shock) and diagnosa the cause		1		
MACS DC4	Skill to recognize and treat arrhythmias and conduction disturbances		т		
MACS DC5	Skill to recognize and treat machanical complications (including parillary		1		
MACOTCO	muscle runture and myocardial runture)		Ι		
M-ACS-PC6	Skill to recognize and treat nations with right vontrigular inferction		T		
M-ACS-PC7	Skill to assess ventricular function and utilize in treatment strategy		1		
M-AUD-1 U/	decisions		Ι		
M ACS DC9	Skill to interpret invesive hemodynamic data and angiographic findings				
M-AUD-1 U0	and apply to treatment strategies		Ι		
M-ACS, DC0	Skill to perform and interpret coronary angiography			п	
M-AUD-1 U7	Skin to perform and interpret coronary anglography.		1	11	1

M-ACS-PC10	Skill to insert intra-arterial and pulmonary artery catheters and interpret the findings.		Ι		
M-ACS-PC11	Skill to assess overall risk, identify candidates for invasive evaluation and treatment, and establish optimal medical regimen in non–ST-elevation acute coronary syndromes.		Ι		
M-ACS-PC12	Skill to identify patients who would benefit from mechanical circulatory support.		Ι		
M-ACS-PC13	Skill to achieve risk-factor target levels for secondary prevention.	Ι			
	Evaluation Tools: chart-stimulated recall, conference presentation, direct of	bservati	on, sim	ulation	
	Systems-Based Practice	12	24	36	Add
M-ACS-SBP1	Work with emergency medical systems, emergency departments, and hospital teams to establish effective first medical contact strategies for cardiovascular emergencies.		Ι		
M-ACS-SBP2	Identify and address financial, cultural, and social barriers to diagnostic and treatment recommendations.	Ι			
M-ACS-SBP3	Utilize a multidisciplinary coordinated approach for patient management, including transfer of care and employment-related issues.		Ι		
M-ACS-SBP4	Practice in a manner that fosters the balance of appropriate utilization of finite resources with the net clinical benefit for the individual patient.		Ι		
	<i>Evaluation Tools:</i> chart-stimulated recall, conference presentation, direct of evaluation, record review	observati	ion, mu	ltisourc	e
	Practice-Based Learning and Improvement	12	24	36	Add
M-ACS-PBL1	Identify gaps in performance and knowledge and perform appropriate personal learning activities.		Ι		
M-ACS-PBL2	Utilize decision support tools for accessing guidelines and pharmacologic information at the point of care.	Ι			
	<i>Evaluation Tools:</i> chart-stimulated recall, direct observation, reflection and	l self-ass	sessmer	nt	
	Professionalism	12	24	36	Add
M-ACS-PROF1	Exhibit sensitivity to patient preference and end-of-life issues.	Ι			
M-ACS-PROF2	Demonstrate sensitivity and responsiveness to diverse patient populations.	Ι			
M-ACS-PROF3	Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest.	Ι			
M-ACS-PROF4	Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff.	Ι			
	Evaluation Tools: direct observation, multisource evaluation				
	Interpersonal and Communication Skills	12	24	36	Add
M-ACS-ICS1	Effectively communicate with acutely ill patients across a broad range of cultural, ethnic, and socioeconomic backgrounds.	Ι			
M-ACS-ICS2	Communicate with all healthcare providers involved in patient care.	Ι			
	<i>Evaluation Tools:</i> chart-stimulated recall, direct observation, multisource e	valuatio	n		

Task Force 1, Table 4. Core Competency Components and Curricular Milestones for Training in Valvular Heart Disease

	Madical Knowledge	Milestones (Month			the)
	Metucal Kilowicuge	12	24	36	
M-VALV-MK1	Know the characteristic features and natural history of congenital bicuspid	I	27	- 50	Iluu
M-VALV-MK2	Know the etiology, natural history, pathophysiology, and differential diagnosis of acquired aortic, mitral, pulmonic, and tricuspid valve diseases.		Ι		
M-VALV-MK3	Know the characteristic features and natural history of rheumatic valvular heart disease.	Ι			
M-VALV-MK4	Know the cardinal symptoms and physical findings of aortic and of mitral stenosis and their role in management decisions.	Ι			
M-VALV-MK5	Know the cardinal symptoms and physical findings of chronic aortic and chronic mitral regurgitation and their roles in management decisions.		Ι		
M-VALV-MK6	Know the causes and distinguishing characteristics of acute versus chronic mitral and aortic regurgitation.		Ι		
M-VALV-MK7	Know the natural history, clinical features, and complications of mitral valve prolapse.	Ι			
M-VALV-MK8	Know the appropriate indications for, and characteristic findings of, echocardiographic testing for diagnosis and assessment of severity during initial evaluation and upon follow-up.		Ι		
M-VALV-MK9	Know the role of stress testing in assessment of valvular heart disease.			Ι	
M-VALV-MK10	Know the indications for MRI and CT in the assessment of valvular heart disease.		Ι		
M-VALV-MK11	Know the indications for, and characteristic findings with, cardiac catheterization in patients with valvular heart disease.		Ι		
M-VALV-MK12	Know the indications for, and clinical pharmacology of, drugs used for the treatment of native and prosthetic valvular heart disease, including anticoagulation and antibiotic prophylaxis.	Ι			
M-VALV-MK13	Know the effects of arrhythmias on the clinical manifestations, risks of complications, and management of valvular heart disease.		Ι		
M-VALV-MK14	Know the indications and expected outcomes for surgical therapy in valvular heart disease, including valve selection and repair versus replacement.		Ι		
M-VALV-MK15	Know the indications and expected outcomes for transcatheter therapy in valvular heart disease.		Ι		
M-VALV-MK16	Know the etiology, natural history, physical findings, differential diagnosis, complications, and treatment of native valve and prosthetic valve endocarditis.		Ι		
M-VALV-MK17	Know the effects of pregnancy on the clinical manifestations and management of patients with valvular heart disease (native and prosthetic).		Ι		
	Evaluation Tools: chart-stimulated recall, direct observation, in-training exa	am			
	Patient Care and Procedural Skills	12	24	36	Add
M-VALV-PC1	Skill to identify cardinal physical findings and ECG abnormalities in patients with valvular heart disease.		Ι		
M-VALV-PC2	Skill to distinguish innocent from pathologic heart murmurs.		Ι		
M-VALV-PC3	Skill to manage patients with valvular heart disease and coronary artery disease.		Ι		
M-VALV-PC4	Skill to select appropriate testing and integrate results with clinical findings in the evaluation and management of patients with valvular heart disease.		Ι		
M-VALV-PC5	Skill to distinguish aortic stenosis from hypertrophic obstructive cardiomyopathy and other causes of LVOT obstruction.	Ι			
M-VALV-PC6	Skill to recognize bicuspid aortic valve disease and its associated abnormalities.	Ι			
M-VALV-PC7	Skill to recognize impact of ventricular dysfunction on clinical decision- making in valvular heart disease.	Ι			

M-VALV-PC8	Skill to recognize the cause and impact of pulmonary hypertension in		Ι		
	management of valvular neart disease.				
M-VALV-PC9	Skill to determine candidacy and optimal timing of cardiac surgical or		I		
	transcatheter treatments in patients with valvular heart disease.		_		
M-VALV-PC10	Skill to perform and interpret transesophageal echocardiography in			п	
	patients with valvular heart disease.			11	
M-VALV-PC11	Skill to perform and interpret diagnostic catheterization in patients with			п	
	valvular heart disease.			11	
	Evaluation Tools: chart-stimulated recall, direct observation, logbook, simu	lation			
	Systems-Based Practice	12	24	36	Add
M-VALV-SBP1	Participate in interdisciplinary decision-making with regard to surgery and		т		
	transcatheter therapy.		1		
M-VALV-SBP2	Practice in a manner that fosters the balance of appropriate utilization of		т		
	finite resources with the net clinical benefit for the individual patient.		1		
	Evaluation Tools: chart-stimulated recall, conference presentation, direct of	oservatio	on, mul	tisource	è
	evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-VALV-PBL1	Identify competency gaps and engage in opportunities to achieve focused		т		
	education and performance improvement.		1		
M-VALV-PBL2	Utilize decision support tools for accessing guidelines and pharmacologic		т		
	information at the point of care.		1		
	Evaluation Tools: in-training exam, reflection and self-assessment				
	Professionalism	12	24	36	Add
M-VALV-PROF1	Exhibit sensitivity to patient preference and end-of-life issues.		Ι		
M-VALV-PROF2	Practice within the scope of personal expertise or technical skills.		Ι		
	Evaluation Tools: in-training exam, reflection and self-assessment	•	•		
	Interpersonal and Communication Skills	12	24	36	Add
M-VALV-ICS1	Engage in shared decision-making with patients about their condition and		т		
	the options for diagnosis and treatment.		1		
	<i>Evaluation Tools:</i> direct observation, multisource evaluation	•		•	•

Task Force 1, Table 5. Core Competency Components and Curricular Milestones for Training in Pericardial Disease

	Madical Knowledge	Milestones (Mor			tha)
	Meulcal Knowledge	12		36 (WIOII	
M_PFRI_MK1	Know the pathophysiology differential diagnosis and natural history of	14		- 30	Auu
	acute and relapsing pericarditis	Ι			
M-PERI-MK2	Know the pathophysiology, differential diagnosis, and natural history of	<u> </u>			
	pericardial effusion and pericardial tamponade.	Ι			
M-PERI-MK3	Know the pathophysiology, differential diagnosis, and natural history of				
	constrictive pericarditis.		I		
M-PERI-MK4	Know the cardinal physical findings of acute pericarditis, pericardial		т		
	tamponade, and constrictive pericarditis.		1		
M-PERI-MK5	Know the indications for pericardiocentesis.	Ι			
M-PERI-MK6	Know the indications for, and clinical pharmacology of, drugs used for the	т			
	treatment of acute and relapsing pericarditis.	1			
M-PERI-MK7	Know the effects of pericardial disease on other organ systems.		Ι		
M-PERI-MK8	Know pericardial anatomy and structural abnormalities (pericardial cyst		т		
	and congenital absence of the pericardium).		1		
M-PERI-MK9	Know the indications for, and characteristic findings in, imaging studies		т		
	of pericardial diseases.		1		
M-PERI-MK10	Know the indications for surgical referral in pericardial diseases and the		т		
	expected outcomes.		1		
	Evaluation Tools: chart-stimulated recall, global evaluation, in-training exa	ım			
	Patient Care and Procedural Skills	12	24	36	Add
M-PERI-PC1	Skill to clinically evaluate, diagnose, and manage patients with acute		т		
	pericarditis and with chronic relapsing pericarditis.		1		
M-PERI-PC2	Skill to identify cardinal physical findings and evaluate and manage		т		
	patients with pericardial effusion, including tamponade.		1		
M-PERI-PC3	Skill to identify cardinal physical findings and evaluate and manage		т		
	patients with constrictive pericarditis.		1		
M-PERI-PC4	Skill to appropriately select and incorporate data from laboratory testing				
	and noninvasive imaging in the evaluation and management of patients		Ι		
	with pericardial disease.				
M-PERI-PC5	Skill to perform pericardiocentesis.			II	
M-PERI-PC6	Skill to distinguish constrictive pericarditis from restrictive cardiac		т		
	disease.		-		
M-PERI-PC7	Skill to identify patients who should be referred for cardiac catheterization		T		
	in the evaluation of pericardial disease.	ļ	_		ļ
M-PERI-PC8	Skill to identify patients with constrictive pericarditis who are candidates		Ι		
	for referral for consideration of cardiac surgery.				
	Evaluation Tools: direct observation, global evaluation, logbook, simulation	n	1	1	1
	Systems-Based Practice	12	24	36	Add
M-PERI-SBP1	Utilize a multidisciplinary coordinated approach for patient management,		Ι		
	including transfer of care and employment-related issues.				
M-PERI-SBP2	Incorporate risk-benefit analysis and cost considerations in diagnostic and		Ι		
	treatment decisions.	<u> </u>	L		
	Evaluation Tools: chart-stimulated recall, conference presentation, direct of	oservatio	on, mul	tisource)
	evaluation		1	1	1
	Practice-Based Learning and Improvement	12	24	36	Add
M-PERI-PBL1	Identify competency gaps and engage in opportunities to achieve focused		T		
	education and performance improvement.		-		
	Evaluation Tools: chart-stimulated recall, in-training exam, reflection and s	elf-asse	ssment		
	Professionalism	12	24	36	Add
M-PERI-PROF1	Exhibit sensitivity to patient preference and end-of-life issues.	<u> </u>	Ι		
M-PERI-PROF2	Practice within the scope of personal expertise or technical skills.		Ι		
	Evaluation Tools: direct observation, global evaluation, multisource evaluation	tion			1
	Interpersonal and Communication Skills	12	24	36	Add
M-PERI-ICS1	Communicate with and educate patients and families across a broad range		T		
	of cultural, ethnic, and socioeconomic backgrounds.		1		

M-PERI-ICS2	Engage in shared decision-making with patients about their condition and the options for diagnosis and treatment.		Ι	
	Evaluation Tools: direct observation, global evaluation, multisource evalua	tion		

Task Force 2, Table 1. Core Competency Components and Curricular Milestones for Training in Cardiovascular Disease Prevention

	Medical Knowledge Milestones (Me		Milestones (Month		ths)
		12	24	36	Add
M-PREV-MK1	Know the structure of the normal artery and the basic vascular biology of atherosclerotic vascular disease.	Ι			
M-PREV-MK2	Know the principles of genetics as applied to cardiovascular disease and pharmacogenomics as applied to cardiovascular therapy.		Ι		
M-PREV-MK3	Know the impact of family history on disease risk and utility of family screening in cardiovascular disease prevention.	Ι			
M-PREV-MK4	Know the clinical epidemiology of cardiovascular disease, including incidence/prevalence, sex and ethnic differences, and the influence of traditional risk factors and demographics on outcomes.	Ι			
M-PREV-MK5	Know the principles for implementation both of individual and population-based cardiovascular disease prevention.	Ι			
M-PREV-MK6	Know the major tools to assess both lifetime and 10-year risks of a first cardiovascular event and influence primary prevention measures	Ι			
M-PREV-MK7	Know the evidence for incremental benefit over a traditional risk-based approach, as well as the advantages, disadvantages, and limitations of screening methods to assess subclinical atherosclerosis (including biomarkers, coronary calcification, carotid intima-media thickness, and ankle-brachial index).		Ι		
M-PREV-MK8	Know the effects of diabetes mellitus, obesity, hypertension, lipid disorders, physical inactivity, and tobacco use on the development and progression of atherosclerosis, and their treatment strategies.	Ι			
M-PREV-MK9	Know the physiology and assessment of diabetes mellitus and principles of its management and comanagement in patients with cardiovascular disease.	Ι			
M-PREV-MK10	Know the physiology, assessment, and management of lipid disorders, including in special populations.	Ι			
M-PREV-MK11	Know the physiology, presentation, evaluation and management of hypertensive disorders, including refractory hypertension.	Ι			
M-PREV-MK12	Know the principles of nutrition and obesity assessment and management, including the roles of pharmacotherapy and bariatric surgery.	Ι			
M-PREV-MK13	Know the roles and management principles for behavioral and psychosocial contributions to cardiovascular disease.	Ι			
M-PREV-MK14	Know the principles and roles of exercise physiology, physical activity counseling, and cardiac rehabilitation.	Ι			
M-PREV-MK15	Know the tools and principles for managing and counseling regarding tobacco cessation.	Ι			
M-PREV-MK16	Know the effects of systemic diseases and their treatments (including renal, hepatic, inflammatory, and autoimmune-related disorders) on cardiovascular risk factors and their management.	Ι			
M-PREV-MK17	Know adverse effects of obstructive and central sleep apnea on the incidence and control of hypertension, atrial fibrillation and other arrhythmias, congestive heart failure, and atherosclerosis.	Ι			
M-PREV-MK18	Know the indications for noninvasive screening for carotid artery disease, abdominal aortic aneurysm, and peripheral vascular disease.	Ι			
M-PREV-MK19	Know the impact of reproductive stages, pregnancy, and of hormonal treatment for reproductive disorders on cardiovascular risk.	Ι			
M-PREV-MK20	Know the principles of antithrombotic therapy in cardiovascular disease.	Ι			
M-PREV-MK21	Know the pharmacology, indications, contraindications, and interactions of medications commonly used in cardiovascular disease prevention and therapy (e.g., antithrombotic agents, antihypertensive agents, lipid- lowering agents, agents used in diabetes management, and agents used in cessation of tobacco).	Ι			
	Evaluation Tools: chart-stimulated review, direct observation, in-training e	exam		-	
	Patient Care and Procedural Skills	12	24	36	Add

M-PREV-PC1	Skill to perform global risk assessment and appropriately utilize				
	diagnostic testing – both in patients at risk for and those with prior	I			
	cardiovascular events or diagnoses				
M_PREV_PC2	Skill to evaluate a patient's family history and appropriately recommend	т		 	
WI-I KE V-I C2	family screening	1			
M DDEV DC3	Shill to identify notionts who may have common systemic disorders that				
M-PREV-PC3	offect condicusces long discussion and treatment such as clean annea	Ι			
	affect cardiovascular disease diagnosis and treatment such as sleep apnea				
	and thyroid disorders.				
M-PREV-PC4	Skill to implement and prescribe lifestyle approaches for the prevention	I			
	and treatment of hypertension, dyslipidemia, tobacco use, obesity, and	_			
	diabetes mellitus.				
M-PREV-PC5	Skill to assess physical activity patterns and exercise capacity and provide	т			
	physical activity counseling and exercise prescription, as well as	1			
	counseling on whether to return to sports.				
M-PREV-PC6	Skill to identify patients who will benefit from low-density lipoprotein		Ι		
	apheresis.				
M-PREV-PC7	Skill to identify patients for whom antiplatelet therapy is indicated.	Ι			
M-PREV-PC8	Skill to identify and address factors that contribute to nonadherence to	T			
	treatment regimen.	1			
		-			-
M-PREV-PC9	Skill to utilize individualized risk-benefit assessment in the management	T			
	of patients and adapt prevention strategies to patients with specific	_			
	comorbidities (e.g., diabetes mellitus, chronic kidney disease, arthritis).				
M-PREV-PC10	Skill to appropriately integrate new medical information into patient care.	Ι			
			1		1.
	Evaluation Tools: chart-stimulated recall, direct observation, registry and/o	r hospit	al prog	ram qua	ality
	data	1.			
	Systems-Based Practice	12	24	- 36	Add
M-PREV-SBP1	Practice in a manner that best balances appropriate utilization of finite	Ι			
	resources with the net clinical benefit for the individual patient				
	resources with the net enhibed benefit for the matyradal parent.				
M-PREV-SBP2	Utilize an interdisciplinary team approach for disease management.	I			
M-PREV-SBP2	Utilize an interdisciplinary team approach for disease management.	Ι			
M-PREV-SBP2 M-PREV-SBP3	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of	I			
M-PREV-SBP2 M-PREV-SBP3	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care.	I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment	I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence.	I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex	I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep annea	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established	I I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation	I I I I			
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation	I I I I I 12	24	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1	Iterative interference of the interference of the interference Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to	I I I I I 12	24 I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.	I I I I I 12	24 I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Utilize point-of-service resources to enhance adherence to guidelines and	I I I I 12	24 I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional	I I I I I 12	24 I I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Utilize an interdisciplinary team approach for disease management. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Utilize point-of-service resources to enhance adherence to guidelines and protocols an	I I I I 12	24 I I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Iteration interference of the interview partner. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/or	I I I I I I r hospit	24 I I al prog	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Iteratives with the laternineal content for the individual patient. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment	I I I I I I r hospit	24 I I al prog	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Iteration for the net of the formation of the net of the	I I I I I I r hospit	24 I I al prog	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2	Iteration is an end of the content for the final reach patient. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment Professionalism Know and promote adherence to guidelines and appropriate use criteria.	I I I I I 12 r hospit	24 I I al prog	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2 M-PREV-PBL2	Iteration is an end of the content for the final field patient. Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment Professionalism Know and promote adherence to guidelines and appropriate use criteria.	I I I I I I r hospit	24 I I al prog	36 ram qua 36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2 M-PREV-PBL2	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment Demonstrate respect for individuals with lifestyle disorders such as	I I I I I I r hospit 12 I	24 I I al prog 24 I	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2 M-PREV-PBL2	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment Professionalism Know and promote adherence to guidelines and appropriate use criteria. Demonstrate respect for individuals with lifestyle disorders such as obesity and tobacco use.	I I I I I r hospit	24 I I al prog	36	Add
M-PREV-SBP2 M-PREV-SBP3 M-PREV-SBP4 M-PREV-SBP5 M-PREV-SBP6 M-PREV-PBL1 M-PREV-PBL2 M-PREV-PBL2 M-PREV-PROF1 M-PREV-PROF2 M-PREV-PROF3	Utilize an interdisciplinary team approach for disease management. Coordinate patient care among healthcare providers, including transfer of care. Identify and address financial, cultural, and social barriers to treatment implementation and adherence. Appropriately utilize specialty care for patients with advanced or complex diabetes mellitus, complex lipid disorders, refractory hypertension, obesity, depression, or sleep apnea. Appropriately utilize disease management tools and protocols as an aid in the management of patients with high risk-factor burden and established chronic diseases. Evaluation Tools: direct observation, multisource evaluation Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Utilize point-of-service resources to enhance adherence to guidelines and protocols and obtain new information from clinical trials and professional societies. Evaluation Tools: chart-stimulated recall, direct observation, registry and/o data, reflection and self-assessment More adherence to guidelines and appropriate use criteria. Demonstrate respect for individuals with lifestyle disorders such as obesity and tobacco use. Practice prevention in your personal lifestyle and promote a culture of	I I I I I I r hospit I I I	24 I I al prog	36 7am qua 36	Add

	and community.					
	<i>Evaluation Tools:</i> conference presentation, direct observation, multisource evaluation					
	Interpersonal and Communication Skills	12	24	36	Add	
M-PREV-ICS1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds regarding appropriate risk factor modification.		Ι			
M-PREV-ICS2	Communicate in ways that patients and families can understand the evidence on which recommendations are based.		Ι			
M-PREV-ICS3	Evaluate a patient's health literacy and appropriately adapt counseling strategies and tools.	Ι				
M-PREV-ICS4	Communicate effectively with patients, families, and referring physicians.	Ι				
	Evaluation Tools: direct observation, multisource evaluation					

Task Force 3, Table 1. Core Competency Components and Curricular Milestones for Training in ECG/Ambulatory ECG

	Medical Knowledge	Milestones (Mon		tha)	
	Meuical Knowledge	12			uis)
M TEST ECC ME1	Vnow the basis minerales of electrocondicements and the energy is of	14	24	- 30	Auu
M-TEST-ECG-MIKI	Know the basic principles of electrocardiography and the operation/use of the instruments to eccuring display and store electrocardiography (See	т			
	Appendix 2)	1			
M TEST FOO MKA	Appendix 5.)				
M-TEST-ECG-MK2	Know the underlying cellular and ionic mechanisms in the genesis of				
	surface electrocardiograms and the effects of the autonomic nervous $(0, 1, 2)$		1		
	system. (See Appendix 3.)				
M-TEST-ECG-MK3	Know the normal values for electrical axis and electrocardiographic	I			
	intervals, durations, and voltage.				
M-TEST-ECG-MK4	Know the anatomy of the specialized conducting tissue and the spread of	T			
	excitation in conduction system and myocardium.	-			
M-TEST-ECG-MK5	Know reentry, automaticity, and triggered activity mechanisms for cardiac		т		
	arrhythmias.		1		
M-TEST-ECG-MK6	Know the types and mechanisms of aberrancy.		Ι		
M TEST ECC MK7	Know conturn and fusion complexes and the electrocardiographic pattern				
M-TEST-ECG-WIK/	Rilow capture and fusion complexes and the electrocardiographic patern oritorio for distinguishing supressontrioular arrhythmias with sharroney				
	cineria for distinguishing supraventricular armytimilas with aberrancy,			Ι	
	accessory pantway conduction, pacing, and artifact from ventricular				
M TEST ECO MIZO	annyunnas. Vnow the concerts of concerts discussion and a 'third set the'				
WI-LEST-EUG-MIK8	Now the concepts of conceated conduction and exit block and their			Ι	
	mannestation on the electrocardiogram.				
М-ТЕЅТ-ЕСС-МК9	Know the characteristic electrocardiographic patterns of key clinical			Ι	
	diagnoses. (See Appendix 4.)				
M-TEST-ECG-MK10	Awareness of ECG changes that are commonly seen in highly trained				
	athletes and the challenges in distinguishing normal from abnormal		I		
	findings.				
M-TEST-ECG-MK11	Know the indications for, and limitations of, continuous (Holter) and	т			
	intermittent (event) ambulatory electrocardiographic recording.	1			
	Evaluation Tools: direct observation, ECG and rhythm interpretation during a	simulati	on trai	ning (e.g	g.,
	mock codes), global evaluation, in-training exam				
	Patient Care and Procedural Skills	12	24	36	Add
M-TEST-ECG-PC1	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead	12 I	24	36	Add
M-TEST-ECG-PC1	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings.	12 I	24	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and	<u>12</u> І	24	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).	<u>12</u> I	24 I	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right	12 I	24 I	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.	12 I	24 I I	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay	12 I	24 I I	36	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).	<u>12</u> I	24 I I	36 I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities). Skill to identify types of atrioventricular dissociation.	12 I	24 I I	36 I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities). Skill to identify types of atrioventricular dissociation.	12 I	24 I I	36 I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities). Skill to identify types of atrioventricular dissociation. Skill to identify first-degree, second-degree (types I, II, 2:1, and high	12 I	24 I I	36 I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6	Patient Care and Procedural Skills Technical skills to perform and record high quality standard 12-lead electrocardiographic tracings. Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement). Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement. Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities). Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.	12 I	24 I I	36 I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac	12 I	24 I I I	36 I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.	12 I	24 I I I	36 I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic patterns and localization and cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and	12 I	24 I I I	36 I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.	12 I	24 I I I	36 I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8 M-TEST-ECG-PC9	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify non-specific QRS and ST-T wave changes.	12 I	24 I I I I	36 I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8 M-TEST-ECG-PC9 M-TEST-ECG-PC9	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify non-specific QRS and ST-T wave changes.Skill to identify atrial atriovantricular nodal and wastricular architeker.	12 I	24 I I I I	36 I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8 M-TEST-ECG-PC9 M-TEST-ECG-PC10	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify non-specific QRS and ST-T wave changes.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.		24 I I I I	36 I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC8 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and rug thread at rhythms in Appendix 4.		24 I I I I	36 I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC11	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify types of atrioventricular dissociation.Skill to identify tips expansion atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and repredix 4.		24 I I I I	36 I I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC12	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.		24 I I I I I	36 I I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC12	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-leadelectrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, andartifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and rightand left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delayor block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and highdegree, and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiacischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte andmetabolic abnormalities and drug effects.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to integrate electrocardiographic findings into clinical and riskassessments and the management of patients.		24 I I I I I	36 I I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC12 M-TEST-ECG-PC13	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic patterns and localization of cardiac ischemia and infarction.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify each of the specific patterns and rhythms in Appendix 4.Skill to integrate electrocardiographic findings into clinical and risk assessments and the management of patients.Skill to select and interpret ambulatory electrocardiographic recording "It is the select and interpret ambulatory electrocardiographic recording		24 I I I I I	36 I I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC12 M-TEST-ECG-PC13	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify non-specific QRS and ST-T wave changes.Skill to identify each of the specific patterns and rhythms in Appendix 4.Skill to integrate electrocardiographic findings into clinical and risk assessments and the management of patients.Skill to identify each of the specific patterns and rhythms in Appendix 4.Skill to identify each of the specific patterns and rhythms in clinical and risk assessments and the management of patients.Skill to select and interpret ambulatory electrocardiographic recording studies.		24 I I I I I I	36 I I I I I I I	Add
M-TEST-ECG-PC1 M-TEST-ECG-PC2 M-TEST-ECG-PC3 M-TEST-ECG-PC4 M-TEST-ECG-PC5 M-TEST-ECG-PC6 M-TEST-ECG-PC7 M-TEST-ECG-PC7 M-TEST-ECG-PC9 M-TEST-ECG-PC10 M-TEST-ECG-PC11 M-TEST-ECG-PC12 M-TEST-ECG-PC14	Patient Care and Procedural SkillsTechnical skills to perform and record high quality standard 12-lead electrocardiographic tracings.Skill to identify normal electrocardiographic patterns, normal variants, and artifacts (including incorrect lead placement).Skill to identify electrocardiographic signs of atrial abnormalities and right and left ventricular hypertrophy or enlargement.Skill to identify types and significance of intraventricular conduction delay or block (including functional or aberrant conduction abnormalities).Skill to identify types of atrioventricular dissociation.Skill to identify first-degree, second-degree (types I, II, 2:1, and high degree), and third-degree atrioventricular blocks.Skill to identify the electrocardiographic changes of electrolyte and metabolic abnormalities and drug effects.Skill to identify non-specific QRS and ST-T wave changes.Skill to identify atrial, atrioventricular, nodal, and ventricular arrhythmias.Skill to identify each of the specific patterns and rhythms in Appendix 4.Skill to identify ach of the specific patterns and rhythms in Appendix 4.Skill to identify normal and abnormal pacemaker rhythms/functions, and		24 I I I I I I	36 I I I I I I I I	Add

	interpretation.				
	Evaluation Tools: direct observation, ECG exam, in-training exam				
	Systems-Based Practice	12	24	36	Add
M-TEST-ECG-SBP1	Skill to retrieve and utilize ECG tracings in electronic data systems.	Ι			
	Evaluation Tools conference presentation, direct observation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-TEST-ECG-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.			Ι	
	Evaluation Tools: conference presentation, ECG exam				
	Professionalism	12	24	36	Add
M-TEST-ECG-PROF1	Professionalism Practice within the scope of expertise and technical skills.	12 I	24	36	Add
M-TEST-ECG-PROF1 M-TEST-ECG-PROF2	Professionalism Practice within the scope of expertise and technical skills. Know and adhere to evidence-based and appropriate use criteria for ECG testing.	12 I	24	36 I	Add
M-TEST-ECG-PROF1 M-TEST-ECG-PROF2	Professionalism Practice within the scope of expertise and technical skills. Know and adhere to evidence-based and appropriate use criteria for ECG testing. Evaluation Tools: conference presentation, direct observation, multisource erassessment	I2 I valuatio	24 n, refle	36 I ction an	Add d self-
M-TEST-ECG-PROF1 M-TEST-ECG-PROF2	Professionalism Practice within the scope of expertise and technical skills. Know and adhere to evidence-based and appropriate use criteria for ECG testing. Evaluation Tools: conference presentation, direct observation, multisource erassessment Interpersonal and Communication Skills	12 I valuatio 12	24 n, refle 24	36 I ction an 36	Add d self-
M-TEST-ECG-PROF1 M-TEST-ECG-PROF2 M-TEST-ECG-ICS1	Professionalism Practice within the scope of expertise and technical skills. Know and adhere to evidence-based and appropriate use criteria for ECG testing. Evaluation Tools: conference presentation, direct observation, multisource er assessment Interpersonal and Communication Skills Communicate testing results to physicians and patients in an effective and timely manner.	12 I valuatio 12	24 n, refle 24	36 I ction an 36 I	Add d self-

Task Force 3, Table 2. Core Competency Components and Curricular Milestones for Training in Exercise ECG Testing

	Medical Knowledge	Milestones (Month		ths)	
	Miculcal Kilowicuge	12	24	36	
	Know the indications, risks, limitations, and contraindications for	14	27	30	Auu
M-TEST-STRESS-MK1	exercise stress testing both for diagnosis and risk stratification in		Ι		
	nations with suspected or known coronary heart disease				
	Know the principles and details of exercise testing, including the				
M-TEST-STRESS-MK2	standard requirements of a safe testing laboratory and technical		Ι		
	requirements of proper lead placement and skin preparation				
	Know the application of Bayes' theorem to interpret exercise test		Ŧ		
M-TEST-STRESS-MK3	results		1		
			×		
M-TEST-STRESS-MK4	Know the common exercise test protocols and targets.		1		
	Vnow the concept of matchelic acquivelent (MET) and estimation of		_		
M-TEST-STRESS-MK5	Allow the concept of metabolic equivalent (MET) and estimation of		1		
	exercise intensity in different modes of exercise.				
M-TEST-STRESS-MK6	Know the electrocardiographic criteria for a positive test.		Ι		
M-TEST-STRESS-MK7	Know the normal and abnormal heart rhythm and blood pressure		Ι		
	responses to graded exercise and in recovery.				
M-TEST-STRESS-MK8	Know the electrocardiographic, exercise capacity, and/or		Т		
	hemodynamic findings indicating a strongly positive test or adverse		1		
	prognosis.				
M-TEST-STRESS-MK9	Know the changes in the electrocardiogram that may result from			T	
	exercise, hyperventilation, ischemia, hypertrophy, conduction			1	
	disorders, electrolytes, and drugs.				
M-TEST-STRESS-MK10	Know the criteria and indications for stopping a test before reaching		Ι		
	the target heart rate.				
M-TEST-STRESS-MK11	Know the significance of exercise-associated arrhythmias.			Ι	
M-TEST-STRESS-MK12	Know the use of exercise testing in special groups (women,			т	
	asymptomatic subjects, post-myocardial infarction, or recent acute			1	
	coronary syndrome patients).				
M-TEST-STRESS-MK13	Know the use, precautions, and contraindications of exercise testing in			Ι	
	patients with valvular and myocardial diseases.				
M-TEST-STRESS-MK14	Know the effects of baseline electrocardiographic abnormalities and		Ι		
	medications on exercise testing.				
M_TEST_STRESS_MK15	Know clinical and baseline electrocardiographic findings that warrant		Ι		
WI-1E51-51KE55-WIKI5	the addition of imaging to the exercise electrocardiogram.				
M TEST STDESS MK16	Know the indications for the selection of pharmacologic rather than		Ι		
WI-1E51-51KE55-WIKI0	exercise testing.				
M TEST STDESS MK17	Know the indications for, and the sensitivity and specificity of, adding			I	
WI-1E51-51KE55-WIK17	echocardiographic or nuclear perfusion imaging to stress ECG testing.			_	
M TEST STDESS MK18	Known the indications for myocardial perfusion imaging and the		Ι		
WI-1E51-51KE55-WIK18	appropriate selection of exercise versus pharmacologic stress testing.				
M TEST STRESS METO	We are the sele of stores to the in account of uslamlar heart discourse			T	
WI-1E51-51KE55-WIK19	Know the role of stress testing in assessment of varvular heart disease.			-	
M TECT CEDECC MIZO	Know the role of exercise ECG testing in the evaluation of			T	
WI-1E51-51KE55-WIK20	arrhythmias.			1	
	Know the role of exercise ECG testing in the evaluation of genetic				
M-TEST-STRESS-MK21	cardiovascular conditions (e.g., long QT syndrome), including			Ι	
	hypertrophic cardiomyopathy.				
	Know the role of cardiopulmonary exercise testing in the evaluation of		T		
M-TEST-STRESS-MK22	dyspnea.		1		
	Know the role of exercise testing in physical activity and exercise	1	т		
M-TEST-STRESS-MK23	prescription in patients with cardiovascular disease.		I		
	Know the role of exercise testing with measurement of ankle-brachial				
M-TEST-STRESS-MK24	indices in the evaluation of patients with known or suspected			Ι	
	peripheral arterial disease.				

<i>Evaluation Tools:</i> chart-stimulated recall, direct observation, in-training exam						
	Patient Care and Procedural Skills	12	24	36	Add	
M-TEST-STRESS-PC1	Skill to select clinically-appropriate exercise test type and protocol for diverse patient types and clinical settings.			Ι		
M-TEST-STRESS-PC2	Skill to safely perform appropriate heart-rate limited and maximal or near-maximal treadmill exercise tests.		Ι			
M-TEST-STRESS-PC3	Skill to identify and effectively treat complications during and following stress testing.			Ι		
M-TEST-STRESS-PC4	Skill to utilize exercise symptoms and capacity, ECG findings, and hemodynamic response in the risk assessment and management of patients.			Ι		
M-TEST-STRESS-PC5	Skill to interpret limb segmental blood pressure measurements, pulse volume recordings, and treadmill vascular exercise tests.			Ι		
M-TEST-STRESS-PC6	Skill to utilize data from the exercise test in deriving an exercise prescription for patients with cardiovascular disease.			Ι		
	Evaluation Tools: chart-stimulated recall, conference presentation, direct	t observ	ation, l	ogbook		
	Systems-Based Practice	12	24	36	Add	
M-TEST-STRESS-SBP1	Effectively lead and coordinate the exercise test inter-professional team (including nurses and technicians) to ensure safe and efficient care.			Ι		
M-TEST-STRESS-SBP2	Incorporate risk/benefit analysis and cost considerations in test selection.			Ι		
	Evaluation Tools: conference presentation, direct observation, multisour	rce evalu	ation			
	Practice-Based Learning and Improvement	12	24	36	Add	
M-TEST-STRESS-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.			Ι		
M-TEST-STRESS-PBL2	Review practice alignment with guidelines.			Ι		
	Evaluation Tools: conference presentation, direct observation, reflection	and sel	f-asses	sment		
	Professionalism	12	24	36	Add	
M-TEST-STRESS-PROF1	Demonstrate sensitivity and responsiveness to diverse patient populations.			Ι		
M-TEST-STRESS-PROF2	Know and adhere to evidence-based and appropriate use criteria for utilizing stress testing.			Ι		
	<i>Evaluation Tools:</i> conference presentation, direct observation, multisour self-assessment	rce evalu	ation,	reflectio	on and	
	Interpersonal and Communication Skills	12	24	36	Add	
M-TEST-STRESS-ICS1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.			Ι		
M-TEST-STRESS-ICS2	Communicate testing results to physicians and patients in an effective and timely manner.			Ι		
	Evaluation Tool: multisource evaluation					

Task Force 5, Table 1. Core Competency Components and Curricular Milestones for Training in Echocardiography

	Madical Knowledge	Milestones (Mont		Modical Knowladge Milestones			the)
	Wieucai Kilowieuge	12	24	26 (WIUII			
M IMAC ECHO MK1	Know the physical principles of ultrasound and the instrumentation	14	24	- 30	Auu		
WI-IMAG-ECHO-WIKI	used to obtain images	Ι					
M-IMAG-ECHO-MK2	Know the appropriate indications including the AUC for: M-mode 2-						
	dimensional and 3-dimensional transthoracic echocardiography.						
	Doppler echocardiography and color flow imaging, transesophageal		T				
	echocardiography tissue Doppler and strain imaging, numerosphagean		-				
	echocardiography, dissue Dopplet and strain maging, and contrast						
M-IMAG-ECHO-MK3	Know the limitations and potential artifacts of the echocardiographic	-					
	examination.	I					
M-IMAG-ECHO-MK4	Know the standard views included in a comprehensive transthoracic	Ŧ					
	echocardiography.	I					
M-IMAG-ECHO-MK5	Know the standard views included in a comprehensive transesophageal						
	echocardiography.		1				
M-IMAG-ECHO-MK6	Know the techniques to quantify cardiac chamber sizes and evaluate						
	left and right ventricular systolic and diastolic function and			П			
	hemodynamics.						
M-IMAG-ECHO-MK7	Know the characteristic findings of cardiomyopathies.		I				
M-IMAG-ECHO-MK8	Know the use of echocardiographic and Doppler data to evaluate		_				
M-IMAG-LEHO-MIKO	native and prosthetic valve function and diseases			II			
M-IMAC-ECHO-MK9	Know the echocardiographic and Doppler findings of cardiac ischemia						
W-IWAG-LCHO-WK	and infarction, and the complications of myocardial infarction		Ι				
M-IMAG-ECHO-MK10	Know the echocardiographic findings of pericardial disease pericardial						
W-IWAG-LCHO-WIKI0	effusion and pericardial constriction		II				
M-IMAC-ECHO-MK11	Know the characteristic findings of basic adult congenital heart						
W-IWAG-LCHO-WIXII	disease			II			
M-IMAG-ECHO-MK12	Know the findings of complex/postoperative adult congenital heart						
	disease.			III*†	III*		
M-IMAG-ECHO-MK13	Know the techniques to evaluate cardiac masses and suspected						
	endocarditis.		II				
M-IMAG-ECHO-MK14	Know the techniques to evaluate diseases of the aorta.		II				
M-IMAG-ECHO-MK15	Know the techniques to assess pulmonary artery pressure and diseases						
	of the right heart		II				
M-IMAG-ECHO-MK16	Know the use and characteristic findings in the evaluation of patients						
	with systemic diseases involving the heart.		Ш				
M-IMAG-ECHO-MK17	Know the indications for, and the echocardiographic findings in						
	patients with known or suspected cardioembolic events.		11				
M-IMAG-ECHO-MK18	Know key aspects of contrast echocardiography including						
	interpretation, administration techniques, and safety information.			II			
M-IMAG-ECHO-MK19	Understand the principles and applications of 3-dimensional						
	echocardiography.		II				
M-IMAG-ECHO-MK20	Recognize and treat the potential complications of stress contrast and						
WI-IWIAG-LCHO-WIK20	transesonhageal echocardiography		II				
	Evaluation Tools: conference presentation, direct observation, in-trainin	g exam					
	Patient Care and Procedural Skills	12	24	36	Add		
M-IMAG-ECHO-PC1	Skill to perform and interpret a basic transthoracic echocardiography		т				
	exam.		1				
M-IMAG-ECHO-PC2	Skill to perform and interpret comprehensive transthoracic		İ				
	echocardiography exam.						
M-IMAG-ECHO-PC3	Skill to perform and interpret comprehensive transesophageal						
	echocardiography exam.			11			
M-IMAG-ECHO-PC4	Skill to recognize pathophysiology, quantify severity of disease.		İ				
_	identify associated findings, and recognize artifacts in			II			
	echocardiography.						
M-IMAG-ECHO-PC5	Skill to integrate echocardiographic findings with clinical and other		Ι				

	testing results in the evaluation and management of patients.				
M-IMAG-ECHO-PC6	Skill to interpret stress echocardiography.			II	
M-IMAG-ECHO-PC7	Skill to incorporate stress hemodynamic information in the				
	management of complex valve disease or hypertrophic			II	
	cardiomyopathy.				
M-IMAG-ECHO-PC8	Skill to utilize echocardiographic techniques during cardiac				
	interventions, including intraoperative transesophageal			III†	III
	echocardiography.				
M-IMAG-ECHO-PC9	Skill to perform and interpret basic 3-dimensional echocardiography.			II	
M-IMAG-ECHO-PC10	Skill to utilize advanced 3-dimensional echocardiography during			III†	ш
	guidance of procedures and/or surgery.				
M-IMAG-ECHO-PC11	Skill to perform and interpret contrast echocardiography studies.			II	
	Evaluation Tools: direct observation, logbook, simulation				
	Systems-Based Practice	12	24	36	Add
M-IMAG-ECHO-SBP1	Work effectively and efficiently with the echocardiography laboratory	T			
	staff.	-			
M-IMAG-ECHO-SBP2	Incorporate risk/benefit, safety, and cost considerations in the use of			I	
	ultrasound techniques.			-	
M-IMAG-ECHO-SBP3	Participate in echocardiographic quality monitoring and initiatives.			II	
	Evaluation Tools: direct observation multisource evaluation				
	Evaluation Tools. uncer observation, multisource evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-IMAG-ECHO-PBL1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities	12	24 I	36	Add
M-IMAG-ECHO-PBL1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.	12	24 I	36	Add
M-IMAG-ECHO-PBL1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation	12	24 I	36	Add
M-IMAG-ECHO-PBL1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism	12	24 I 24	36 36	Add
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use	12	24 I 24 I	36 36	Add
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria.	12	24 I 24 I	36	Add Add
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the	12 12	24 I 24 I	36	Add Add
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff.	12 12 I	24 I 24 I	36 36	Add Add
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour	12 12 I cce evalu	24 I I Iation, ,	36 36 reflectio	Add Add On and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment	12 12 I I rce evalu	24 I I I nation,	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment	12 12 I cce evalu	24 I I iation,	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad	12 12 I ce evalu	24 I 24 I iation,	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.	12 12 I ce evalu	24 I I iation, II	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1 M-IMAG-ECHO-ICS2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Communicate testing results to physicians and patients in an effective	12 12 I I cce evalu	24 I 24 I nation, II	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1 M-IMAG-ECHO-ICS2	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Communicate testing results to physicians and patients in an effective and timely manner.	12 12 I I I I I	24 I I nation, II II	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1 M-IMAG-ECHO-ICS2 M-IMAG-ECHO-ICS3	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Communicate testing results to physicians and patients in an effective and timely manner. Communicate detailed information on cardiac anatomy for surgical	12 12 I cce evalu	24 I I nation, II II	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1 M-IMAG-ECHO-ICS2 M-IMAG-ECHO-ICS3	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Communicate testing results to physicians and patients in an effective and timely manner. Communicate detailed information on cardiac anatomy for surgical planning or guidance of interventional procedures.	12 12 I cce evalu	24 I 24 I intervention III	36 36 reflectio	Add Add on and
M-IMAG-ECHO-PBL1 M-IMAG-ECHO-PROF1 M-IMAG-ECHO-PROF2 M-IMAG-ECHO-ICS1 M-IMAG-ECHO-ICS2 M-IMAG-ECHO-ICS3	Practice-Based Learning and Improvement Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: conference presentation, direct observation Professionalism Know and promote adherence to guidelines and appropriate use criteria. Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff. Evaluation Tools: conference presentation, direct observation, multisour self-assessment Interpersonal and Communication Skills Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds. Communicate testing results to physicians and patients in an effective and timely manner. Communicate detailed information on cardiac anatomy for surgical planning or guidance of interventional procedures. Evaluation Tools: direct observation, multisource evaluation	12 12 I ce evalu	24 I 24 I iation, II	36 36 reflectio	Add Add on and

*Because of its unique and specialized nature, competency in the interpretation of complex and postoperative congenital heart disease echocardiography studies will usually require training beyond Level II.

[†]See definition of Level III training in Section 1.2.

Task Force 6, Table 1. Core Competency Components and Curricular Milestones for Training in Nuclear Cardiology

	Medical Knowledge	Milestones (Month		ths)	
	interieur minomeruge	12	24	36	Add
M-IMAG-NC-MK1	Know the principles of single-photon emission computed tomography			00	1144
	and radionuclide ventriculography image acquisition and display,		Ι		
	including the standard tomographic planes and views.				
M-IMAG-NC-MK2	Know the properties and use of standard perfusion tracers.			Ι	
M-IMAG-NC-MK3	Know the principles of radiation safety and how to minimize radiation			п	
	exposure.			- 11	
M-IMAG-NC-MK4	Know the indications for myocardial perfusion imaging and the	т			
	appropriate selection of exercise versus pharmacologic stress testing.	1			
M-IMAG-NC-MK5	Know the principles and use of pretest probability and sequential	I			
	probability analysis to assess posttest probability.	_			
M-IMAG-NC-MK6	Know the mechanism of pharmacologic stress agents, methods of their		Ι		
	administration, and safety issues in using the agents.				
M-IMAG-NC-MK/	the influence of the clinical situation on choice of imaging protocol		Ι		
M-IMAG-NC-MK8	Know the quality control issues how to review raw data and				
	recognize artifacts.			II	
M-IMAG-NC-MK9	Know the use of nuclear cardiology in the assessment of ventricular		-		
	function.		1		
M-IMAG-NC-MK10	Know the protocols for the use of perfusion imaging to assess		т		
	myocardial viability.		1		
M-IMAG-NC-MK11	Know the indications for positron emission testing imaging and use of			П	
	positron emission testing tracers.				
	Evaluation Tools: direct observation, in-training exam				-
	Patient Care and Procedural Skills	12	24	36	Add
M-IMAG-NC-PC1	Skill to select the appropriate imaging study.		Ι		
M-IMAG-NC-PC2	Skill to integrate perfusion imaging findings with clinical and other test		T		
	results in the evaluation and management of patients.		-		
M-IMAG-NC-PC3	Skill to identify results that indicate a high-risk state.		I	**	
M-IMAG-NC-PC4	Skill to perform and interpret gated stress-rest perfusion study.				
M-IMAG-NC-PC5	Skill to perform and interpret a radionuclide ventriculography study.			11	TTT
MI-IMAG-NC-PC0	Skill to perform and unerpiet hybrid SPECT/CT and PET/CT imaging.				111
M-IMAG-NC-PC7	metabolism				III
M-IMAG-NC-PC8	Skill to perform and interpret cardiac innervation first pass				
	and planar studies.				III
	<i>Evaluation Tools:</i> conference presentation, direct observation, logbook				
	Systems-Based Practice	12	24	36	Add
M-IMAG-NC-SBP1	Work effectively and efficiently with the nuclear laboratory staff.			II	
M-IMAG-NC-SBP2	Incorporate risk/benefit and cost considerations in the use of			T	
	radionuclide imaging techniques.			1	
M-IMAG-NC-SBP3	Participate in laboratory quality monitoring and initiatives.			II	
	<i>Evaluation Tools:</i> chart-stimulated recall, conference presentation, direct	t observ	vation, 1	multisou	irce
	evaluation	10	24	26	LL A
M IMAC NC DDI 1	Identify knowledge and performance gaps and engage in opportunities	12	24	30	Add
M-IMAG-NC-PDL1	to achieve focused education and performance improvement			Ι	
	<i>Evaluation Tools:</i> conference presentation direct observation				
	Desfaction align	10	24	26	LL A
MIMAC NC PROFI	Frotessionalism	14	24	30	Add
IVI-IIVIAG-IVU-FAUFI	criteria		Ι		
M-IMAG-NC-PROF2	Interact respectfully with patients, families, and all members of the				
	health care teaM-including ancillary and support staff.	Ι			
	<i>Evaluation Tools:</i> chart-stimulated recall, conference presentation. direc	t observ	ation		I
	Interpersonal and Communication Skills	12	24	36	Add

M-IMAG-NC-ICS1	Communicate effectively and timely with patients, families, and referring physicians.	Ι	II	
M-IMAG-NC-ICS2	Communicate test results in a comprehensive and user-friendly		II	
	manner.			
	Evaluation Tools: direct observation, multisource evaluation			

Task Force 7, Table 1. Core Competency Components and Curricular Milestones for Training in Cardiovascular Computed Tomography

	Medical Knowledge	Milesto			ths)
		12	24	36	Add
M-IMAG-CCT-MK1	Know the principles of cardiovascular computed tomographic scanning		Ι		
	and the scanning modes.				
M-IMAG-CCT-MK2	Know the risks and safety measures for cardiovascular computed			Ι	
	tomographic scanning, including radiation reduction strategies.				
M-IMAG-CCT-MK3	Know the appropriate indications for cardiovascular computed		т		
	tomography for screening or evaluating symptoms in patients with		1		
	suspected cardiac disease.				
M-IMAG-CCT-MK4	Know the indications, potential adverse effects, prevention, and		I		
	treatment of complications of iodinated contrast agent use in				
	cardiovascular computed tomographic studies.				
M-IMAG-CC1-MK5	Know the indications and protocols for beta-adrenergic blocking drugs			11	
	and introgrycerin during cardiovascular computed tomographic studies.				
M-IMAG-CC1-MK6	Know the principles of cardiovascular computed tomographic scan			II	
	window and level view settings				
M-IMAG-CCT-MK7	Know the principles of post-processing methods for cardiovascular			п	
	computed tomographic scanning			11	
M-IMAG-CCT-MK8	Know the algorithms used for reconstruction and recognize and isolate			II	
	causes of artifacts.				
M-IMAG-CCT-MK9	Know the principles of quantitative coronary artery calcium scoring.			II	
M-IMAG-CCT-MK10	Know normal chest anatomy and common incidental extra cardiac			II	
	findings.				
M-IMAG-CCT-MK11	Know the characteristic cardiovascular computed tomographic images			T	
	of normal cardiac chambers and great vessels, normal coronary arteries			1	
	and veins, and normal variants.				
M-IMAG-CCT-MK12	Know the characteristic cardiovascular computed tomographic findings			II	
	of coronary atherosclerosis including plaque morphology and				
MIMAC CCT MK12	Assessment of stenosis seventy.				
WI-IMAG-CCT-MIKI5	of anomalous coronary arterias and other common congenital			II	
	anomalies				
M-IMAG-CCT-MK14	Know the characteristic cardiovascular computed tomographic findings				
	in postoperative cardiac surgical patients including internal mammary			Π	
	artery and saphenous vein bypass grafts.				
M-IMAG-CCT-MK15	Know the characteristic cardiovascular computed tomographic findings			II	
	of acquired and congenital valvular disease.				
M-IMAG-CCT-MK16	Know the characteristic cardiovascular computed tomographic findings			II	
	of left atrial and pulmonary and coronary venous abnormalities.				
M-IMAG-CCT-MK17	Know the characteristic cardiovascular computed tomographic findings			II	
	of pericardial disease.				
M-IMAG-CCT-MK18	Know the characteristic cardiovascular computed tomographic findings			II	
	of cardiomyopathies and infiltrative myocardial diseases.				
M-IMAG-CCT-MK19	Know the differential diagnosis of cardiac masses identified by			11	
MIMAC CCT ME20	Cardiovascular computed tomography.				
	of common diseases of the aorta and great vessels			II	
	or common diseases of the aorta and great vessels.				
M-IMAG-CCT-MK21	Know the characteristic cardiovascular computed tomographic findings			П	
	of pulmonary embolism and primary and acquired pulmonary vascular				
	diseases.			-	
м-імад-сст-мк22	Know when to request help with interpretation of difficult studies, such as patients with complex congenital heart disease.			Ι	
	Evaluation Tools: conference presentation, direct observation, in-trainin	g exam			

	Patient Care and Procedural Skills	12	24	36	Add
M-IMAG-CCT-PC1	Skill to appropriately utilize cardiovascular computed tomography in the evaluation and management of patients with known or suspected cardiovascular disease.			Ι	
M-IMAG-CCT-PC2	Skill to integrate cardiovascular computed tomographic findings with other clinical information in patient evaluation and management.			Ι	
M-IMAG-CCT-PC3	Skill to recognize and treat contrast-related adverse reactions.	Ι			
M-IMAG-CCT-PC4	Skill to independently perform and interpret cardiovascular computed tomography.			II	
M-IMAG-CCT-PC5	Skill to perform and interpret hybrid CT/SPECT and CT/PET imaging.				III
	<i>Evaluation Tools</i> : conference presentation, direct observation, logbook				
	Systems-Based Practice	12	24	36	Add
M-IMAG-CCT-SBP1	Incorporate appropriate use criteria, risk/benefit, and cost considerations in the use of cardiovascular computed tomography and alternative imaging modalities.		Ι		
	Evaluation Tools: conference presentation, direct observation, multisour	ce evalu	ation		
	Practice-Based Learning and Improvement	12	24	36	Add
M-IMAG-CCT-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.			Ι	
M-IMAG-CCT-PBL2	Utilize point-of-care educational resources (e.g., guidelines, appropriate use criteria, and clinical trial results).			Ι	
	Evaluation Tools: conference presentation, direct observation, reflection	and sel	f-asses	sment	-
	Professionalism	12	24	36	Add
M-IMAG-CCT-PROF1	Work effectively in an interdisciplinary CCT environment.		Ι		
M-IMAG-CCT-PROF2	Reliably obtain patient informed consent, ensuring that patients understand the risks and benefits of—and alternatives to— cardiovascular computed tomographic testing.		Ι		
M-IMAG-CCT-PROF3	Know and promote adherence to clinical practice guidelines.		Ι		
	Evaluation Tools: conference presentation, direct observation, multisour	ce evalu	uation		
	Interpersonal and Communication Skills	12	24	36	Add
M-IMAG-CCT-ICS1	Communicate testing results to physicians and patients in an effective and timely manner.		Ι		
	Evaluation Tools: direct observation, multisource evaluation				

Task Force 8, Table 1. Core Competency Components and Curricular Milestones for Training in Cardiovascular Magnetic Resonance

	Medical Knowledge	Milestones (M			(Months)			
	interieur isitometuge	12	24	36	Add			
M-IMAG-CMR-MK1	Know the principles of cardiovascular magnetic resonance image		I	00	Tiuu			
M-IMAG-CMR-MK2	Know the principles of safety and contraindications for cardiovascular	-						
	magnetic resonance imaging.	I						
M-IMAG-CMR-MK3	Know the uses, potential side effects, and contraindications of using							
	gadolinium-based contrast agents in cardiovascular magnetic	Ι						
	resonance imaging.							
M-IMAG-CMR-MK4	Know the indications for cardiovascular magnetic resonance to assess		т					
	left and right heart chamber sizes and function.		I					
M-IMAG-CMR-MK5	Know the cardiovascular magnetic resonance indications for		т					
	assessment of myocardial viability.		1					
M-IMAG-CMR-MK6	Know the cardiovascular magnetic resonance indications and		т					
	characteristic findings of myocardial ischemia.		1					
M-IMAG-CMR-MK7	Know the cardiovascular magnetic resonance indications and		т					
	characteristic findings of acute myocardial infarction.		1					
M-IMAG-CMR-MK8	Know the cardiovascular magnetic resonance indications and							
	characteristic findings of acute coronary syndromes and other causes		Ι					
	of myocardial injury.							
M-IMAG-CMR-MK9	Know the cardiovascular magnetic resonance indications and		Ι					
	differential findings in cardiomyopathies of uncertain cause.		_					
M-IMAG-CMR-MK10	Know the cardiovascular magnetic resonance indications to assess		Ι					
	diseases of the pericardium.							
M-IMAG-CMR-MKII	Know the cardiovascular magnetic resonance indications to evaluate		Ι					
	Valvular heart disease.							
M-IMAG-CMR-MK12	Know the cardiovascular magnetic resonance indications and			Ι				
M IMAC CMD MK12	Characteristic findings of myocardial masses and unroundi.							
WI-IMAG-CWIK-WIK15	And pulmonary voin mapping prior to ablation of strial fibrillation		Ι					
M IMAC CMP MK14	Know the cardiovascular magnetic resonance indications for							
	evaluation of adult congenital heart disease including identification of			T				
	coronary artery anomalies			1				
M-IMAG-CMR-MK15	Know the cardiovascular magnetic resonance indications to detect and							
	evaluate diseases of the aorta and peripheral arteries.			Ι				
	Evaluation Tools: conference presentation direct observation in-trainin	a exam						
	Patient Care and Procedural Skills	12	24	36	Add			
M-IMAC-CMP-PC1	Skill to appropriately order and integrate the results of cardiovascular	14	24	50	Auu			
	magnetic resonance testing with other clinical findings in the			т				
	evaluation and management of nations			1				
M-IMAG-CMR-PC2	Skill to interpret cardiovascular magnetic resonance tissue							
	characterization (late gadolinium enhancement) to distinguish the			Ι				
	etiology of cardiomyopathy and acute myocardial injury.							
M-IMAG-CMR-PC3	Skill to interpret regional and global left and right ventricular wall			п				
	motion and ejection fraction.			11				
M-IMAG-CMR-PC4	Skill to interpret vascular diseases of the aorta (e.g., intramural			п				
	hematoma, dissection, coarctation, and aneurysm).			11				
M-IMAG-CMR-PC5	Skill to identify and characterize myocardial masses.			II				
M-IMAG-CMR-PC6	Skill to identify and characterize pericardial disease.			II				
M-IMAG-CMR-PC7	Skill to identify and diagnose basic congenital heart disease in adults.			II				
M-IMAG-CMR-PC8	Skill to identify and diagnose complex adult congenital heart disease,							
	including quantification of intracardiac shunting, and anomalous			II				
	coronary arteries.							
M-IMAG-CMR-PC9	Skill to perform and interpret cardiovascular magnetic resonance stress			П				
	testing.							
M-IMAG-CMR-PC10	Skill to interpret vascular diseases of the peripheral arteries.				III			

	<i>Evaluation Tools</i> : conference presentation, direct observation, logbook				
	Systems-Based Practice	12	24	36	Add
M-IMAG-CMR-SBP1	Incorporate risk/benefit and cost considerations in the use of		Ι		
	cardiovascular magnetic resonance testing.				
M-IMAG-CMR-SBP2	Participate in cardiovascular magnetic resonance quality monitoring			П	
	and initiatives.			n	
	Evaluation Tools: chart-stimulated recall, conference presentations, dire	ct obser	vation,	multisc	ource
	evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-IMAG-CMR-PBL1	Identify knowledge and performance gaps and engage in opportunities			т	
	to achieve focused education and performance improvement.			1	
	Evaluation Tools: chart-stimulated recall, conference presentations, dire	ct obser	vation,	reflecti	on and
	self-assessment				
	Professionalism	12	24	36	Add
M-IMAG-CMR-PROF1	Practice within the scope of expertise and technical skills.			Ι	
M-IMAG-CMR-PROF2	Know and promote adherence to guidelines and appropriate use		T		
	criteria.		1		
	Evaluation Tools: chart-stimulated recall, conference presentations, dire	ct obser	vation,	multisc	ource
	evaluation				
	Interpersonal and Communication Skills	12	24	36	Add
M-IMAG-CMR-ICS1	Communicate testing results to physicians and patients in an effective		п		
	and timely manner.		11		
	Evaluation Tools: direct observation, multisource evaluation				•

Task Force 9, Table 1. Core Competency Components and Curricular Milestones for Training in Vascular Medicine

	Medical Knowledge	Milostonos (a (Mon	tha)
	Medical Kilowieuge	12		S (IVIOII 26	
M VASC MK1	Know the anatomy of the peripheral arterial and venous systems	12 I	24	- 30	Auu
W-VASC-WIKI	Know the anatomy of the peripheral arternal and venous systems.	1			
M-VASC-MK2	Know the causes and clinical epidemiology of atherosclerotic				
	peripheral vascular disease, including the incidence and prevalence,	Ι			
	sex and ethnic differences, role of genetics, and the influence of				
	traditional risk factors and demographics on outcomes.				
M-VASC-MK3	Know the pathophysiology of peripheral artery disease, including		т		
	atherosclerosis, thrombosis, embolism, entrapment, vasculitis, and		1		
	vasospasm.				
M-VASC-MK4	Know the pathophysiology, causes and clinical epidemiology of aortic	Ι			
	aneurysms.				
M-VASC-MK5	Know the pathophysiology, causes, and clinical epidemiology of acute		Ι		
	aortic syndromes such as dissection and intramural hematoma.				
M-VASC-MK6	Know the pathophysiology, causes, and clinical epidemiology of deep	Ι			
	vein thrombosis and pulmonary embolism.				
M-VASC-MK7	Know the pathophysiology, causes, and clinical epidemiology of		Ι		
	cerebrovascular disease.				
M-VASC-MK8	Know the pathophysiology, causes, and clinical epidemiology of		Ι		
	chronic venous insufficiency and varicose veins.				
M-VASC-MK9	Know the pathophysiology, causes, and clinical epidemiology of			II	
	lymphedema.				
M-VASC-MK10	Know the cardinal symptoms and physical findings of peripheral	Ι			
	atherosclerotic vascular diseases, including peripheral artery disease,				
	renal and mesenteric artery disease, extracranial cerebrovascular				
	disease, and abdominal aortic aneurysm.				
M-VASC-MK11	Know the cardinal symptoms and physical findings of venous diseases	т			
	including venous thromboembolism, chronic venous insufficiency, and	1			
	varicose veins.				
M-VASC-MK12	Know the differentiating characteristics between arterial, venous, and			II	
	neurotrophic lower extremity ulcers.				
M-VASC-MK13	Know the natural history and prognosis of deep vein thrombosis and	Ι			
	pulmonary embolism.				
M-VASC-MK14	Know the natural history and prognosis of peripheral atherosclerotic				
	vascular diseases including peripheral artery disease, renal and		Ι		
	mesenteric artery disease, extracranial carotid artery disease, and				
	abdominal aortic aneurysm.				
M-VASC-MK15	Know the indications for noninvasive screening for abdominal aortic		Ι		
	aneurysm.				-
M-VASC-MK16	Know the indications for duplex ultrasound of the peripheral veins and		T		
	carotid arteries and for duplex and physiological testing of the		-		
	peripheral arteries.				
M-VASC-MK17	Know the indications for duplex ultrasonography of the renal and			П	
	mesenteric arteries, arterial bypass grafts and stents, aortic endografts,				
	and intracranial vessels (i.e., transcranial Doppler).				
M-VASC-MK18	Know the indications and contraindications for computed tomographic		I		
	angiography and magnetic resonance angiography in patients with		_		
	suspected vascular disease.		-		
M-VASC-MK19	Know the appropriate indications and laboratory tests to assess for				
	innerited and acquired thrombophilia.				
M-VASC-MK20	Know the appropriate indications and laboratory tests to assess for				
	vasculitis.				
M-VASC-MK21	Know the indications, contraindications, risks, clinical pharmacology,				
	and interactions of drugs used to treat atherosclerotic vascular diseases.	-	ļ		
M-VASC-MK22	Know the indications, contraindications, risks, clinical pharmacology,	I			
	and interactions of drugs used to treat thrombotic disorders.	I	1		1

M-VASC-MK23	Know the indications, contraindications, risks, and expected outcomes	т			
	for thrombolytic therapy for venous thromboembolism (pulmonary	1			
	embolism and deep vein thrombosis).				
M-VASC-MK24	Know the indications and risks for surgical and endovascular		Ι		
	treatments for acute aortic syndromes; and, the expected outcomes.				
M-VASC-MK25	Know the indications and risks for surgical and endovascular		Ι		
	treatments for aortic aneurysm; and, the expected outcomes.				
M-VASC-MK26	Know the indications and risks for surgical and endovascular				
	treatments for peripheral atherosclerotic vascular diseases, including		Ι		
	peripheral artery disease, renal and mesenteric artery disease, and				
	extracranial cerebrovascular disease; and the expected outcomes.				
	Evaluation Tools: chart-stimulated recall, global evaluation, in-training	exam			
	Patient Care and Procedural Skills	12	24	36	Add
M-VASC-PC1	Skill to perform the comprehensive physical examination of the	14		50	IIuu
	peripheral arteries including palpation of the abdominal aorta and	Ι			
	peripheral pulses and auscultation for bruits				
M-VASC-PC2	Skill to perform physical examination for suspected peripheral venous				
M- VASC-1 C2	disorders including deep vein thrombosis varicose veins and chronic		Ι		
	venous insufficiency				
M-VASC-PC3	Skill to perform and interpret an ankle-brachial index measurement		T		
M- VASC-1 C5	Skill to perform and interpret an ankle ordeniar index inclusionent.		1		
M-VASC-PC4	Skill to perform physical examination maneuvers for arterial				
	compression syndromes (e.g., thoracic outlet, median arcuate ligament,				III
	and popliteal artery entrapment syndromes).				
M-VASC-PC5	Skill to interpret limb segmental blood pressure measurements, pulse				
	volume recordings and Doppler waveforms, and treadmill vascular			II	
	exercise tests.				
M-VASC-PC6	Skill to interpret duplex ultrasound examinations of the extracranial				
	carotid arteries peripheral arteries abdominal aorta renal and			II	
	mesenteric arteries, and peripheral veins				
M-VASC-PC7	Skill to evaluate and manage aortic aneurysms including identification		I		
	of nations for whom surgical or endovascular repair is indicated		1		
M-VASC-PC8	Skill to evaluate and manage acute aortic syndromes including				
	identification of nations for whom surgical or endovascular therapy is		I		
	indicated.				
M-VASC-PC9	Skill to evaluate and manage patients with deep venous thrombosis and				
	pulmonary embolism including identification of patients for whom		I		
	thrombolytic therapy is indicated.				
M-VASC-PC10	Skill to perform preoperative risk assessment and manage patients		I		
	undergoing vascular surgery.		-		
M-VASC-PC11	Skill to evaluate and manage lower extremity peripheral artery disease.		Ι		
			-		
M-VASC-PC12	Skill to evaluate and manage extracranial carotid artery disease.		Ι		
	······································				
M-VASC-PC13	Skill to evaluate and manage patients with chronic venous		1		
	insufficiency and varicose veins, including use of compression therapy				III
	and identification of patients for whom additional venous procedures				
	are indicated (i.e., sclerotherapy, ablation, or surgery).				
M-VASC-PC14	Skill to evaluate lymphedema.			II	
M-VASC-PC15	Skill to manage lymphedema.				III
M-VASC-PC16	Skill to diagnose and manage arterial access complications, including				III
	arteriovenous fistula and arterial pseudoaneurysms.				
M-VASC-PC17	Skill to evaluate and manage lower extremity wounds, including				TTT
	indications for adjunctive imaging and biopsy, indications and				ш
	techniques for debridement, and selection of appropriate dressings.				

M-VASC-PC18	Skill to evaluate and manage Raynaud's phenomenon.				III
M-VASC-PC19	Skill to evaluate and manage other temperature related disorders,				III
	including acrocyanosis, pernio, and erythromelalgia.				
M-VASC-PC20	Skill to evaluate and manage uncommon vascular disorders, including				
	vascular compression syndromes (e.g., thoracic outlet, popliteal				III
	entrapment), fibromuscular dysplasia, arteriopathies associated with				
	innerited disorders of connective tissue, and congenital vascular				
M VASC PC21	Shill to evaluate and manage peripheral and viscoral artery anaurysms				
WI-VASC-I C21	including identification of patients for whom surgical or endovascular				III
	repair is indicated.				
	<i>Evaluation Tools:</i> chart-stimulated recall, direct observation, global eval	luation			1
	Systems-Based Practice	12	24	36	Add
M-VASC-SBP1	Practice in a manner that balances appropriate utilization of finite	12		20	1144
	resources with the net clinical benefit for the individual patient.		1		
M VASC SPD2	Utiliza an interdissiplinery, seerdinated enpressed for nationt			TT	
WI-VASC-SDF2	management			11	
M-VASC-SRP3	Utilize a coordinated approach for natient management including				
	coordination with rehabilitation services, physical and occupational				III
	therapy, and consideration of employment-related issues.				
M-VASC-SBP4	Know the components of quality assurance in the noninvasive vascular			п	
	laboratory, including certification of technical and medical personnel,			11	
	laboratory accreditation, and internal quality improvement initiatives.				
	Evaluation Tools: chart-stimulated recall, direct observation, multisource	e evalua	ation		
	Practice-Based Learning and Improvement	12	24	36	Add
M-VASC-PBL1	Identify knowledge and performance gaps and engage in opportunities		Ι		
M WASC DDI 2	to achieve focused education and performance improvement.		T		
M-VASC-PBL2	pharmacologic information at the point of care		1		
	Evaluation Tools: chart-stimulated recall conference presentation glob	l al evalu	ation		
	Professionalism	12	24	36	Add
M-VASC-PROF1	Forego recommending unvalidated diagnostic testing or treatments	14	I	50	Auu
M-VASC-PROF2	Demonstrate a commitment to carry out professional responsibilities		-		
M-VASC-I KOF2	appropriately refer patients, and respond to patient needs in a way that			II	
	supersedes self-interest.				
M-VASC-PROF3	Know and promote adherence to guidelines and appropriate use			т	
	criteria.			1	
M-VASC-PROF4	Interact respectfully with patients, families, and all members of the	T			
	healthcare team, including ancillary and support staff.	1			
	Evaluation Tools: chart-stimulated recall, direct observation, multisource	e evalua	ation		
	Interpersonal and Communication Skills	12	24	36	Add
M-VASC-ICS1	Communicate with and educate patients and families across a broad	Ι			
	range of cultural, ethnic, and socioeconomic backgrounds.				
MI-VASC-ICS2	Communicate with other specialists for optimal interdisciplinary			II	
	Evaluation Toola direct cheematics and the second second				1
	Evaluation 1001s: direct observation, multisource evaluation				

Task Force 10, Table 1. Core Competency Components and Curricular Milestones for Training in Invasive Cardiology

	Medical Knowledge	<u>Ig in invasive Ca</u> Miloste		Milestones (Months)		
	Medical Kilowledge	12		s (MOII 26		
M INV/INT ME1	Know the indications/contraindications and potential complications of	14	24	- 30	Auu	
	cardiac catheterization for assessment of coronary valvular		Ι			
	myocardial and basic adult congenital heart diseases					
M-INV/INT-MK2	Know the principles of radiation safety		T			
	The principles of radiation safety.		1			
M-INV/INT-MK3	Know the use and complications of contrast media and the role of renal		T			
	protection measures.		-			
M-INV/INT-MK4	Know the indications for, and clinical pharmacology of, antiplatelet					
	and anticoagulant drugs, and vasopressor and vasodilator agents, used		I			
	in the cardiac catheterization laboratory.					
M-INV/INT-MK5	Know normal cardiovascular hemodynamics and the principles and					
	interpretation of waveforms, pressure, flow, resistance, and cardiac		1			
	output measurements.					
M-INV/INT-MK6	Know the characteristic hemodynamic findings with myocardial,		Ι			
	valvular, pericardial, and pulmonary vascular diseases.					
M-INV/INT-MK7	Know the methods to detect and estimate the magnitude of intracardiac		Ι			
	and extracardiac shunts.					
M-INV/INT-MK8	Know coronary anatomy, its variations and congenital abnormalities,		Ι			
	and its coronary blood flow physiology.					
M-INV/INT-MK9	Know the angiographic features of coronary artery disease and how to		Ι			
	assess the anatomic and physiologic severity.					
M-INV/INT-MK10	Know the vascular anatomy and the indications and contraindications		Ι			
	for, and complications of, peripheral vascular angiography.					
M-INV/INT-MK11	Know the indications and potential complications of percutaneous		Ι			
	coronary, peripheral, valvular, and structural heart interventions.					
M-INV/INT-MK12	Know the indications and contraindications for, and complications of,		Ι			
	endomyocardial biopsy and pericardiocentesis.					
M-INV/INT-MK13	Know the indications for, and the mechanisms of action of, mechanical		Ι			
	circulatory support devices.					
M-INV/INT-MK14	Know the indications for, and complications of, vascular access and		Ι			
	closure strategies and devices.					
	Evaluation Tools: conference presentation, direct observation, in-training	g exam,	logboo	ok, simu	lation	
	Patient Care and Procedural Skills	12	24	36	Add	
M-INV/INT-PC1	Skill to perform pre-procedural evaluation, assess appropriateness.		T			
	obtain informed consent, and plan procedure strategy.		-			
M-INV/INT-PC2	Skill to perform venous and arterial access and obtain hemostasis.		Ι			
	T. T. T. T. T. T. T. T. T. T. T. T. T. T		_			
M-INV/INT-PC3	Skill to perform right heart catheterization.		Ι			
M-INV/INT-PC4	Skill to analyze hemodynamic, ventriculographic, and angiographic		Ι			
	data, and to integrate with clinical findings for patient management.					
M-INV/INT-PC5	Skill to manage post-procedural patients, including complications and		Ι			
	coordination of care.					
M-INV/INT-PC6	Skill to perform endomyocardial biopsy.			II		
M-INV/INT-PC7	Skill to perform pericardiocentesis.			П		
				**		
M-INV/INT-PC8	Skill to perform diagnostic left heart catheterization, ventriculography,			11		
	and coronary angiography.			II		
	Skin to place an intra-aortic balloon pump emergently.			11		
M.INV/INT-PC10	Skill to perform diagnostic peripheral (excluding carotid) angiography			п		
	Skin to perform diagnostic peripheral (excluding carolid) anglography.			11		
M-INV/INT-PC11	Skill to perform percutaneous coronary interventions.				Ш	
	rr	1				

M-INV/INT-PC12	Skill to perform peripheral, carotid, valvular and structural heart				III
M-INV/INT-PC13	Skill to insert and manage percutaneous left ventricular support				ш
	devices.				
	Evaluation Tools: chart-stimulated recall, conference presentation, dire	ct observ	ation, 1	ogbook	
	simulation			U	
	Systems-Based Practice	12	24	36	Add
M-INV/INT-SBP1	Coordinate care in an interdisciplinary approach for patient		Ι		
	management, including transition of care.				
M-INV/INT-SBP2	Utilize cost-awareness and risk/benefit analysis in patient care.		Ι		
	<i>Evaluation Tools:</i> chart-stimulated recall, conference presentation, directly and the state of	ect observ	vation, 1	logbook	
	Practice-Based Learning and Improvement	12	24	36	Add
M-INV/INT-PBL1	Locate, appraise, and assimilate information from scientific studies, guidelines, and registries in order to identify knowledge and performance gaps.		Ι		
M-INV/INT-PBL2	Document number and outcomes of diagnostic and therapeutic		I		
	procedures.		_		
	<i>Evaluation Tools:</i> conference presentation, direct observation, logbook	, reflectio	on and	self-	
	assessment				
	Professionalism	12	24	36	Add
M-INV/INT-PROF1	Practice within the scope of expertise and technical skills.		Ι		
M-INV/INT-PROF2	Know and promote adherence to guidelines and appropriate use criteria.		Ι		
M-INV/INT-PROF3	Interact respectfully with patients, families, and all members of the	Ι			
	healthcare team, including ancillary and support staff.				
	<i>Evaluation Tools:</i> conference presentation, direct observation, multisou self-assessment	urce evalu	uation,	reflection	on and
	Interpersonal and Communication Skills	12	24	36	Add
M-INV/INT-ICS1	Communicate with and educate patients and families across a broad		т		
	range of socioeconomic, ethnic, and cultural backgrounds, including				
	obtaining informed consent.				
M-INV/INT-ICS2	Communicate and work effectively with physicians and other		т		
	professionals on the healthcare team regarding procedure findings,				
	treatment plans, and follow-up care coordination.				
M-INV/INT-ICS3	Complete procedure records and communicate testing results to		Ι		
	physicians and patients in an effective and timely manner.				
	Evaluation Tools: direct observation, multisource evaluation				

Task Force 11, Table 1. Core Competency Components and Curricular Milestones for Training in Cardiac Arrhythmias and Electrophysiology

	Medical Knowledge	Milestones (Months)				
	Multar Knowituge	12	24	36	Add	
M-ARR-MK1	Know the mechanism and characteristics of normal sinus rhythm and of	Ι				
M-ARR-MK2	Know the pathophysiology, differential diagnosis, clinical significance, and approach to management of reentrant tachycardia (atrioventricular nodal re-entrant tachycardia; atrioventricular reciprocating tachycardia), ectopic atrial tachycardias, and accelerated atrioventricular junctional rhythm.		I			
M-ARR-MK3	Know the pathophysiology, differential diagnosis, clinical significance, and approach to management of atrial fibrillation and flutter, including the assessment of stroke and bleeding risk, indications of anticoagulation, and selection of anticoagulant medications.	Ι				
M-ARR-MK4	Know the risk factors for stroke and for bleeding in patients with atrial fibrillation or atrial flutter, as well as the indications for, and use of, anticoagulant medications.	Ι				
M-ARR-MK5	Know the pathophysiology, differential diagnosis, clinical significance, and approach to management of sustained and nonsustained ventricular tachyarrhythmias.		Ι			
M-ARR-MK6	Know the pathophysiology, differential diagnosis, and approaches to risk stratification and management of sudden cardiac death and cardiac arrest, including sudden cardiac death in athletes.		Ι			
M-ARR-MK7	Know the types, mechanisms, differential diagnosis, clinical significance, and approach to management of atrioventricular dissociation and atrioventricular heart blocks (first, second, and third degree).	Ι				
M-ARR-MK8	Know the physical examination characteristics of arrhythmias (e.g., findings of atrioventricular dissociation).		Ι			
M-ARR-MK9	Know the significance of underlying structural or congenital heart disease in the likelihood and significance of cardiac arrhythmias, including sudden death risk, and their impact in clinical management decisions.		Ι			
M-ARR-MK10	Know the indications, contraindications, and clinical pharmacology of antiarrhythmic medications, including drug-drug and drug-device interactions and proarrhythmia potential including acquired long QT syndrome.		Ι			
M-ARR-MK11	Know the indications and limitations of noninvasive testing in the diagnosis and management of patients with arrhythmias: electrocardiogram, ambulatory, event, implantable loop recorder, and tilt-table testing.		Ι			
M-ARR-MK12	Know the indications for, and limitations and complications of, invasive electrophysiologic testing, as well as catheter ablation for cardiac arrhythmias.		Ι			
M-ARR-MK13	Know the indications and contraindications for permanent pacemaker placement, cardiac resynchronization therapy, and implantable cardioverter-defibrillator placement.		Ι			
M-ARR-MK14	Know the pathophysiology, differential diagnosis, natural history, and approach to management of syncope, including neurocardiogenic causes and syncope in athletes.	Ι				
M-ARR-MK15	Know the mechanisms, findings, clinical significance, and approach to management of ventricular pre-excitation.		Ι			
M-ARR-MK16	Know the pathology, clinical significance, and approach to evaluation (including the role of genetic testing) and management of inherited diseases that may cause cardiac arrhythmias due to ion channel abnormalities or structural changes in the heart (including the long QT		Ι			

	syndrome, Brugada syndrome, arrhythmogenic right ventricular				
	dysplasia, hypertrophic dilated cardiomyopathy, and myotonic				
	dystrophy).				
M-ARR-MK17	Know the principles and practice of radiation safety as applied to the	Ι			
	evaluation and management of cardiac electrical disorders.				
M-ARR-MK18	Know the basic principles of programming and interrogating implanted				
	devices (permanent pacemakers, implantable cardioverter-		T		
	defibrillators, cardiac resynchronization therapies, and implantable		-		
	monitors)				
	<i>Evaluation Tools:</i> chart-stimulated recall, global evaluation, in-training	exam			
	Patient Care and Procedural Skill	12	24	36	Add
M-ARR-PC1	Skill to evaluate and manage patients with palpitations.		Ι		
M-ARR-PC2	Skill to evaluate and manage patients with syncope.		Ι		
M-ARR-PC3	Skill to evaluate and manage patients with supraventricular		Ι		
	tachyarrhythmias.				
M-ARR-PC4	Skill to evaluate and manage patients with atrial fibrillation and flutter		Ι		
	(including rate and rhythm control and anticoagulation strategies).				
M-ARR-PC5	Skill to evaluate and manage patients with wide-QRS tachycardia.		I		
			_		
M-ARR-PC6	Skill to manage patients with nonsustained and sustained ventricular		I		
	arrhythmias.				
M-ARR-PC7	Skill to evaluate and manage patients with bradycardia and/or heart		I		
		т			
M-ARR-PC8	Skill to perform electrical cardioversion.	1			
MADD DC0	Skill to perform defibrillation	т			
WI-AKK-FC9	Skill to perform denormation.	1			
M_ARR_PC10	Skill to perform tilt_table testing		п		
	skil to perform the uble testing.				
M-ARR-PC11	Skill to perform temporary pacemaker placement		T		
	skil to perform temporary pacemaker placement.				
M-ARR-PC12	Skill to select and manage patients requiring a permanent pacemaker.			Ι	
	implantable cardioverter-defibrillator, or biventricular pacing.				
M-ARR-PC13	Skill to integrate the information provided in cardiac electrophysiology		т		
	consultation, and reports of procedures and device interrogation, into		1		
	the overall clinical assessment of the patient and plan of management.				
M-ARR-PC14	Skill to perform pacemaker and implantable cardioverter-defibrillator			II	
	interrogation, programming, and surveillance.				
M-ARR-PC15	Skill to perform single- and dual-chamber permanent pacemaker			п	
	implantation and manage complications including device infections			11	
	and chronic lead failure.				
M-ARR-PC16	Skill to perform implantation of implantable loop recorders, interpret			II	
	results to guide patient management, and manage complications.				
M-ARR-PC17	Skill to perform implantable cardioverter-defibrillator and biventricular				III
	device implantation and manage complications.				
M-ARR-PC18	Skill to perform and interpret invasive electrophysiologic testing and				III
	carry out ablation therapy.				
M-ARR-PC19	Skill to utilize magnetic resonance imaging, computed tomography,				Ш
	and intracardiac echocardiography in facilitating invasive				
	electrophysiology and ablation therapies.				
M-ARR-PC20	Skill to follow-up, interrogate, and troubleshoot patients with				
	implanted devices (permanent pacemakers, implantable cardioverter-			II	
	denominators, cardiac resynchronization therapies), including remote				
M ADD DC21	Shill to evolute and manage petients with condition events		т		
WI-AKK-PU21	SKII to evaluate and manage patients with cardiac arrest.		1		

M-ARR-PC22	Skill to prescribe and interpret the results of electrocardiographic recording devices.		Ι		
	<i>Evaluation Tools:</i> chart-stimulated recall, patient safety or quality impre	ovemen	t confe	rence	
	presentation, direct observation, global evaluation, logbook, simulation				
	Systems-Based Practice	12	24	36	Add
M-ARR-SBP1	Utilize an interdisciplinary coordinated approach for patient management, including transfer of care and employment-related issues.		Ι		
M-ARR-SBP2	Use technology and available registries to assess appropriateness, performance, and safety of implanted devices.		Ι		
M-ARR-SBP3	Incorporate risk/benefit analysis and cost considerations in diagnostic and treatment decisions.		Ι		
	Evaluation Tools: chart-stimulated recall, direct observation, multisource	ce evalu	ation		
	Practice-Based Learning and Improvement	12	24	36	Add
M-ARR-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.		Ι		
M-ARR-PBL2	Utilize decision support tools for accessing guidelines and pharmacologic information at the point of care.		Ι		
	Evaluation Tools: chart-stimulated recall, conference presentation, direct	ct obser	vation,	logboo	k
	Professionalism	12	24	36	Add
M-ARR-PROF1	Demonstrate sensitivity to patient preferences and end-of-life issues.		Ι		
M-ARR-PROF2	Practice within the scope of expertise and technical skills.		Ι		
M-ARR-PROF3	Interact respectfully with patients, families, and all members of the health care teaM-including ancillary and support staff.	Ι			
	Evaluation Tools: chart-stimulated recall, conference presentation, direct	ct obser	vation		
	Interpersonal and Communication Skills	12	24	36	Add
M-ARR-ICS1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.		Ι		
M-ARR-ICS2	Engage in shared decision-making with patients, including options for diagnosis and treatment.		Ι		
	<i>Evaluation Tools:</i> direct observation, multisource evaluation				•

Task Force 12, Table 1. Core Competency Components and Curricular Milestones for Training in Heart Failure

	Medical Knowledge	Milestones (Month			ths)
	8	12	24	36	Ádd
M-HF-MK1	Know the pathophysiology, differential diagnosis, stages, and natural history of heart failure.		Ι		
M-HF-MK2	Know the characteristic history and physical exam findings, and their	т			
	limitations, in evaluation of heart failure syndromes.	1			
M-HF-MK3	Know the pathophysiology of heart failure at the molecular, cellular,				
	organ, and organismal levels, with emphasis on the roles of		т		
	neurohormonal activation and left ventricular remodeling in disease		1		
	progression.				
M-HF-MK4	Know the indications, contraindications, and clinical pharmacologyfor	T			
	drugs used for treatment of heart failure, including adverse effects.				
M-HF-MK5	Know the indications, contraindications, and clinical pharmacology for				
	the drugs used for the treatment of heart failure of all etiologies and			11	
	degrees of severity and in special populations.				
MI-HF-MIKO	Know the indications and clinical rationale for the pharmacologic				ш
	support				111
M_HF_MK7	Know the indications contraindications and clinical pharmacology for				
	intravenous vasoactive and inotropic drugs used for cardiovascular		T		
	support in advanced/refractory heart failure.		1		
М-НЕ-МК8	Know the appropriate pharmacologic or nonpharmacologic treatment				
	for the prevention of heart failure in patients with either "pre" or	Ι			
	"established" heart failure.				
M-HF-MK9	Know the clinical pharmacology and use of immunosuppressive				
	medications and other interventions in heart transplant patients in the			II	
	treatment of acute rejection.				
M-HF-MK10	Know the types of and indications for mechanical circulatory support.			II	
M-HF-MK11	Know the effects and interactions of heart failure with other organ				
	systems (kidney, nutritional, metabolic) and in the setting of other		Ι		
	systemic disease.				
M-HF-MK12	Know the management of cardiac arrhythmias in heart failure patients,		-		
	as well as the indications and risks of use of implantable cardioverter-		I		
	defibrillator and cardiac resynchronization therapies.	-	т		
M-HF-MK13	Know the indications for referral for cardiac transplantation.	-	1		
M-HF-MK14	Know the late stage complications of heart failure in patients with				III
M HE MK15	Know the menagement and diagnostic strategies for nonvections with				
	heart failure not due to ischemic heart disease, including infiltrative				
	and restrictive cardiomyopathies inherited cardiomyopathies and			II	
	those associated with pregnancy and chemotherapy.				
M-HF-MK16	Know the management strategies for highly specialized populations				
	with heart failure, including those associated with congenital heart				III
	disease and chronic pulmonary disease.				
	Evaluation Tools: chart-stimulated recall, direct observation, in-training	exam			
	Patient Care and Procedural Skills	12	24	36	Add
M-HF-PC1	Skill to evaluate and manage patients with new-onset, chronic, and	т			
	acute decompensated heart failure.	-			
M-HF-PC2	Skill to evaluate and manage patients with severe heart failure despite			П	
	treatment.				
М-НF-РС3	Skill to evaluate and manage patients with mechanical circulatory				III
	support or after heart transplant.				-
M-HF-PC4	Skill to appropriately obtain and incorporate data from the history,	т			
	aboratory studies, and imaging modalities in evaluation and				
M HE DC5	Shill to interpret imaging regults in the avaluation of heart failure				
M-HF-FC3	nationts		Ι		
1	partento.	1	1	1	1

M-HF-PC6	Skill to interpret imaging results found in advanced, rare, or				Ш
	uncommon forms of heart failure.				
M-HF-PC7	Skill to use history and physical examination findings to accurately			Π	
	assess volume status and perfusion in patients with heart failure.		T		
M-HF-PC8	Skill to perform invasive hemodynamic monitoring.		1		
м-нг-рсу	Skill to incorporate the results of hemodynamic measurements and			п	
	nonnormig to make appropriate management decisions in neart failure			11	
M HE DC10	Shill to incompare any seventy.				
M-HF-PC10	skill to incorporate results of hemodynamic measurements and				
	advanced heart failure patients of all atiologies and severity or in				III
	nation with mechanical circulatory support				
M HE DC11	Skill to identify appropriate condidates for palliative care and hospice		т		
	Skill to identify appropriate calculates for paintative care and hospice.		1		
М-ПГ-РС12	identification of appropriate candidates for implantable cardioverter				
	defibrillators, cardiac resurchronization therapy, or arrhythmia		Ι		
	ablation				
M HE DC13	Skill to select and implement appropriate arrhythmia management				
	including utilization of implantable cardioverter defibrillators, cardiac				
	resynchronization therapy and ablation of arrhythmias in patients with			II	
	heart failure of all etiologies and severity				
M_HF_PC14	Skill to manage patients with advanced heart failure and complex				
WI-III -I C14	arrhythmias including patients with mechanical circulatory support in				ш
	conjunction with clinical cardiac electron hysiologists				111
M-HF-PC15	Skill to recognize and manage comorbidities in heart failure natients		т		
M-HF-PC16	Skill to manage heart failure patients with complex contributing		1		
	comorbidities			II	
M-HF-PC17	Skill to identify and manage patients who require transition from				
	hospital to home or to a care facility while on infusion of inotronic or			п	
	vasoactive agents				
M-HF-PC18	Skill to identify and manage patients who require transition from				
	hospital to home or to a care facility after heart transplant or permanent				Ш
	mechanical circulatory support.				
M-HF-PC19	Skill to appropriately utilize initial screening studies to determine				
	patient eligibility for advanced therapies of individuals cared for at				
	non-transplant / non-ventricular assist device facilities, in collaboration			11	
	with Level III-trained individuals, who work at advanced therapy sites.				
M-HF-PC20	Skill to evaluate, order all appropriate testing, and determine the				
	appropriateness of a patient for cardiac transplant or mechanical				III
	circulatory support.				
M-HF-PC21	Skill to interpret and incorporate results of cardiopulmonary exercise				
	testing into management of heart failure patients, including physical			II	
	activity and exercise recommendations.				
M-HF-PC22	Skill to recognize, manage and seek appropriate consultation for				
	depression or undue anxiety in heart failure patients as part of their		Ι		
	overall care.				
	Evaluation Tools: chart-stimulated review, direct observation, multisour	ce eval	uation		
	Systems-Based Practice	12	24	36	Add
M-HF-SBP1	Utilize appropriate care settings and teams for various levels and stages		т		
	of heart failure.		-		
M-HF-SBP2	Incorporate risk/benefit analysis and cost considerations in diagnostic		т		
	and treatment decisions.		-		
M-HF-SBP3	Identify and address financial, cultural, and social barriers to	T			
	diagnostic and treatment recommendations.	· ·			
M-HF-SBP4	Utilize an interdisciplinary, coordinated, team approach for patient				
	management, including care transitions, palliative care, and		I		
	employment-related issues.				
M-HF-SBP5	Effectively utilize an interdisciplinary approach to monitor the			п	
1	progress of ambulatory patients with heart failure to maintain stability	1	1	1	1

	and avoid preventable hospitalization.				
M-HF-SBP6	Identify the financial, social, and emotional barriers to successful				m
	outcomes after surgery.				111
	Evaluation Tools: chart-stimulated recall, direct observation, multisource	e evalua	ation		_
	Practice-Based Learning and Improvement	12	24	36	Add
M-HF-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.		Ι		
M-HF-PBL2	Utilize decision support tools for accessing guidelines and pharmacologic information at the point of care.			Π	
	<i>Evaluation Tools:</i> conference presentation, direct observation, global evaluation assessment	aluation	, reflec	ction and	d self-
	Professionalism	12	24	36	Add
M-HF-PROF1	Show compassion and effective management of end-of-life issues, including family meetings across the spectrum of patients with heart failure.	Ι			
M-HF-PROF2	Clearly and objectively discuss the therapies available for advanced heart failure, including palliative care, transplant, or mechanical circulatory support.				III
M-HF-PROF3	Interact respectfully with patients, families, and all members of the healthcare team, including ancillary and support staff.	Ι			
	<i>Evaluation Tools:</i> conference presentation, direct observation, multisou self-assessment	rce evalu	uation,	reflection	on and
	Interpersonal and Communication Skills	12	24	36	Add
M-HF-ICS1	Communicate with and educate patients and families across a broad range of cultural, ethnic, and socioeconomic backgrounds.	Ι			
M-HF-ICS2	Engage in shared decision-making with patients, including options for diagnosis and treatment.		Ι		
M-HF-ICS3	Effectively lead and communicate with the interdisciplinary team involved in heart transplant and mechanical circulatory support.				III
	Evaluation Tools: direct observation, multisource evaluation				

Task Force 13, Table 1. Core Competency Components and Curricular Milestones for Training in Critical Care Cardiology

Task Force 15, Table 1. Core	Competency Components and Curricular Winestones for Training in			onthe				
	Medical Knowledge			s (Mon	uns)			
M CCC MV1	Vnow the nothernhysiology differential diagnosis and shower training	12	24	30	Add			
M-CCC-MIKI	know the pathophysiology, differential diagnosis, and characteristic		т					
	condicionaria hypothesia sontia and mixed circulatory shock and of		1					
	the systemic inflammatory response syndrome							
M CCC ME2	Know the indications for and characteristic findings with hadeids		т					
M-CCC-MK2	Know the indications for, and characteristic findings with, bedside		1					
	invasive and noninvasive nemodynamic monitoring.	 			-			
м-ссс-мкз	Know the indications, contraindications, and clinical pharmacology for		Ι					
	vasoactive and inotropic medications used in the treatment of patients							
	with advanced heart failure, hypotension, or shock.	ļ						
м-ссс-мк4	Know the indications, contraindications, and clinical pharmacology for		1					
	anticoagulant, antiplatelet and fibrinolytic agents.	<u> </u>						
м-ссс-мк5	Know the indications for, contraindications to, and clinical		T					
	pharmacology of agents used to treat hypertensive urgencies and		-					
	emergencies.	ļ						
M-CCC-MK6	Know the indications, contraindications, and clinical pharmacology for		т					
	agents used to treat pulmonary hypertension, including intravenous,		1					
	inhalational and oral agents.	L						
M-CCC-MK7	Know the indications, contraindications, and clinical pharmacology for		Ι					
	agents used to treat supraventricular and ventricular arrhythmias.							
M-CCC-MK8	Know the indications for, contraindications to, and risks of catheter-		Ι					
	based techniques to treat supraventricular and ventricular arrhythmias.							
М-ССС-МК9	Know the characteristic clinical, electrocardiographic,							
	echocardiographic, and radiographic findings with pulmonary		т					
	embolism, aortic dissection, pericardial tamponade, acute		1					
	decompensated severe heart failure, severe valvular heart disease, and							
	myocardial infarction.							
M-CCC-MK10	Know the indications for oxygen supplementation, endotracheal		т					
	intubation, and mechanical ventilator support for patients with hypoxia		1					
	and/or respiratory failure.							
M-CCC-MK11	Know the differential diagnosis and characteristic laboratory findings		Ι					
	of oliguria and acute kidney injury.							
M-CCC-MK12	Know the characteristic physical examination, echocardiographic,							
	angiographic, and hemodynamic findings of mechanical complications		Ι					
	of myocardial infarction (e.g., ventricular septal defect, mitral							
	regurgitation, and right ventricular infarction).							
M-CCC-MK13	Know the types of, and indications for, mechanical circulatory support,							
	including intra-aortic balloon counterpulsation, ventricular assist (both		Ι					
	percutaneous and surgical) devices, and extracorporeal membrane							
	oxygenation.							
M-CCC-MK14	Know the principles of treatment of hypotension in special							
	populations, including patients with cardiogenic shock, hypertrophic		Ι					
	obstructive cardiomyopathy, right ventricular infarction, massive							
	pulmonary embolism, pericardial tamponade, and distributive shock.							
M-CCC-MK15	Know the indications for emergency surgery in patients with aortic		Ι					
	dissection.							
M-CCC-MK16	Know the indications for emergent/urgent surgery and transcatheter		Ι					
	valve replacement/repair in patients with severe valvular heart disease.							
M-CCC-MK17	Know the differential diagnosis of heart failure or shock in cardiac		Ι					
	transplant patients.							
M-CCC-MK18	Know the elements of risk scoring systems for the assessment of							
	prognosis in acute coronary syndrome, advanced heart failure, and							
	pulmonary hypertension, including demographics and findings from		Ι					
	the clinical examination, electrocardiogram, biomarker testing,							
	angiography, echocardiography, and invasive hemodynamic							
	assessment.							

M-CCC-MK19	Know the indications for use of hypothermia protocols and the		Ι				
	principles of post-resuscitation bundled care.	───			───		
М-ССС-МК20	Know the elements of scoring systems for assessment of the risk of		I				
	major bleeding in patients treated with antithrombotic medications.	<u> </u>					
	<i>Evaluation Tools:</i> conference presentation, direct observation, in-training	raining exam, simulation					
	Patient Care and Procedural Skills	12	24	36	Add		
M-CCC-PC1	Skill to manage patients with acute myocardial infarction and any		Ι				
	associated rhythm, conduction, or mechanical complications.	<u> </u>					
M-CCC-PC2	Skill to evaluate and manage acutely unstable cardiac patients by						
	integrating the findings from clinical, electrocardiographic, telemetry,		Ι				
	imaging, and hemodynamic assessment – and to develop a plan for						
	bedside intervention.	<u> </u>					
м-ссс-рсз	Skill to place arterial, central venous, and pulmonary artery catheters		Ι				
	and temporary transvenous pacemakers in sequence with cardiac						
M CCC DC4	Calleterization laboratory rotations.		т				
M-CCC-PC4	skin to recognize when renar replacement therapy is indicated, and to		1				
M CCC PC5	Skill to utilize appropriately therepoutic hypothermia protocols in	+	т		-		
M-CCC-I CS	survivors of cardiac arrest in conjunction with neurologic consultants		1				
M-CCC-PC6	Skill to evaluate and manage patients with hemodynamic instability	+	т				
	following cardiac surgery		1				
M-CCC-PC7	Skill to evaluate and manage natients with hemodynamic instability	1	T				
	following transcatheter valve therapy.		1				
M-CCC-PC8	Skill to evaluate and manage supraventricular and ventricular						
	arrhythmias and conduction disturbances in unstable patients in		Ι				
	collaboration with electrophysiology specialists.						
M-CCC-PC9	Skill to use vasopressor and inotropic therapy appropriately in various		Ι				
	types of shock.						
M-CCC-PC10	Skill to incorporate mechanical circulatory support in the management		Ι				
	of critically ill patients.						
M-CCC-PC11	Skill to place intra-aortic balloon pump emergently.				III*		
M-CCC-PC12	Skill to identify and manage pericardial tamponade, including	1	I				
	emergency pericardiocentesis.		-				
M-CCC-PC13	Skill to participate in the perioperative care of heart transplant and		т				
	ventricular assist device patients, in collaboration with heart failure		1				
	experts, interventional cardiologists, and surgical consultants.						
M-CCC-PC14	Skill to monitor blood pressure and hemodynamic state in patients with		т				
	continuous flow left ventricular assist devices, in collaboration with		1				
	heart failure specialists, interventional cardiologists, and/or surgeons.						
M-CCC-PC15	Skill to manage hypertensive urgencies and emergencies.		Ι				
M-CCC-PC16	Skill to manage special populations of critically ill cardiovascular						
	patients including those with aortic dissection, massive or submassive		Ι				
	pulmonary embolism, acute severe valvular regurgitation, and						
	advanced pulmonary hypertension with right ventricular dysfunction.						
M-CCC-PC17	Skill to manage patients with acute bleeding, including bleeding from		Ι				
	vascular access or spontaneous bleeding.						
M-CCC-PC18	Skill to perform noninvasive ventilation and CO ₂ monitoring.		Ι				
M-CCC-PC19	Skill to incorporate oxygen supplementation and mechanical	1	T	1	<u> </u>		
	ventilation in patient management.						
M-CCC-PC20	Skill to perform endotracheal intubation.	1			III		
		┨────	<u> </u>				
MI-CCC-PC21	Skill to utilize risk assessment scoring systems when appropriate in		Ι				
	parone management and counseling.						
M-CCC-PC22	Skill to identify when further medical care is futile and to counsel		Ι				
	families on end-of-life care.						

M-CCC-PC23	Skill to coordinate safe and effective transitions of care in		I		
	collaboration with other members of the care team.		-		
	<i>Evaluation Tools:</i> conference presentation, direct observation, logbook,	simulat	ion		1
	Systems-Based Practice	12	24	36	Add
M-CCC-SBP1	Work effectively with all members of the critical care unit team				
	including heart failure/transplant specialists, electrophysiologists,		т		
	interventionalists, surgeons, pulmonary critical care physicians,		1		
	nephrologists, neurologists, nurses, physician's assistants, pharmacists,				
	social workers, and other team members as required.				
M-CCC-SBP2	Function effectively as team leader for the critical care unit team.				III
M-CCC-SBP3	Participate in hospital quality and safety initiatives in the critical care		Ι		
	units.				
M-CCC-SBP4	Design quality and safety initiatives.				III
M-CCC-SBP5	Utilize interdisciplinary input and expertise in comanagement of		Ι		
	critically ill patients, including transitions of care.				
	Evaluation Tools: conference presentation, direct observation, multisour	rce eval	uation		
	Practice-Based Learning and Improvement	12	24	36	Add
M-CCC-PBL1	Identify knowledge and performance gaps and engage in opportunities		Ι		
	to achieve focused education and performance improvement.				
M-CCC-PBL2	Utilize point-of-service resources to enhance adherence to guidelines		T		
	and protocols and obtain new information from trials and professional		1		
	societies.				
M-CCC-PBL3	Incorporate appropriate use criteria, risk/benefit analysis, and cost		Ι		
	considerations in the use of testing and treatment.				
	Evaluation Tools: conference presentation, direct observation	_	_	-	_
	Professionalism	12	24	36	Add
M-CCC-PROF1	Work effectively in an interdisciplinary critical coronary care unit		Ι		
	environment.				
M-CCC-PROF2	Demonstrate sensitivity to patient preferences and values and end-of-		Ι		
	life issues.				
M-CCC-PROF3	Practice within the scope of expertise and technical skills.		I		
M-CCC-PROF4	Interact respectfully with patients, families, and all members of the		Ι		
	healthcare team, including ancillary and support staff.				
	Evaluation Tools: conference presentation, direct observation, multisour	ce eval	uation	-	_
	Interpersonal and Communication Skills	12	24	36	Add
M-CCC-ICS1	Communicate with and educate patients and families across a broad		Ι		
	range of cultural, ethnic, and socioeconomic backgrounds.				
M-CCC-ICS2	Communicate and work effectively with physicians and other		т		
	professionals on the healthcare team in the management of critically ill		1		
	patients and their transition to other care environments.				
M-CCC-ICS3	Communicate with families with regard to end-of-life decisions with		T		
	respect to programming of pacemakers and implantable cardioverter-				
	detibrillators.				
	Evaluation Tools: direct observation, multisource evaluation				

*Fellows seeking to gain the skill to insert intra-aortic balloon pumps emergently may do so as part of Level II training in cardiac catheterization (see COCATS Task Force 10 report).

Task Force 14, Table 1. Core Competency Components and Curricular Milestones for Training in Adults With Simple Congenital Heart Disease [Atrial septal defects, ventricular septal defects, patent ductus arteriosus, pulmonary stenosis, bicuspid aortic valve, coarctation]

	Medical Knowledge	Milestones (Month		ones (Months)	
		12	24	36	Add
M-ACHD(S)-MK1	Know the anatomy, pathophysiology, associated lesions, and natural histories of atrial septal defects (primum, secundum, and sinus venosus) and ventricular septal defects.		Ι		
M-ACHD(S)-MK2	Know the anatomy, pathophysiology, associated lesions, and natural histories of bicuspid aortic valve, pulmonic stenosis, coarctation of the aorta, and patent ductus arteriosus.		Ι		
M-ACHD(S)-MK3	Know the risk of development and pathophysiology of pulmonary arterial hypertension in adult patients with congenital heart disease, including issues related to noncardiac surgery, pregnancy, contraception, and exercise.		Ι		
M-ACHD(S-MK)4	Know the potential reproductive and genetic implications of basic adult congenital heart disease, both for patients and for potential offspring.			Ι	
M-ACHD(S)-MK5	Know the indications for patient referral to an adult congenital heart disease center.	Ι			
M-ACHD(S)-MK6	Know the cardinal symptoms, physical examination, electrocardiogram, and chest X-ray findings of patients with simple adult congenital heart disease.		Ι		
M-ACHD(S)-MK7	Know the indications for noninvasive and invasive testing for the evaluation of simple adult congenital heart disease.		Ι		
M-ACHD(S)-MK8	Know the indications and contraindications for surgical and percutaneous interventions in adult congenital heart disease.			Ι	
M-ACHD(S)-MK9	Know the indications for endocarditis prophylaxis based on current guidelines.	Ι			
	Evaluation Tools: chart-stimulated recall, conference presentation, dire	ct obsei	vation,	in-traiı	ning
	UAUIII				
	Patient Care and Procedural Skill	12	24	36	Add
M-ACHD(S)-PC1	Patient Care and Procedural Skill Skill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.	12	24 I	36	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2	Patient Care and Procedural Skill Skill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease. Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.	12	24 I I	36	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3	Patient Care and Procedural Skill Skill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease. Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients. Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.	12	24 I I I	36	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4	Patient Care and Procedural Skill Skill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease. Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients. Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention. Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.	12	24 I I I	36 	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.	12	24 I I I I	36 I	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety.	12	24 I I I I I	36 I	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6 M-ACHD(S)-PC7	Patient Care and Procedural Skill Skill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease. Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients. Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention. Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease. Skill to detect the findings of pulmonary arterial hypertension. Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety. Skill to evaluate and manage patients with simple congenital heart disease including appropriate timing for surgical interventions.		24 I I I I I I	36 I	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6 M-ACHD(S)-PC7	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety.Skill to evaluate and manage patients with simple congenital heart disease including appropriate timing for surgical interventions.	12	24 I I I I I I Vation	36 I	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6 M-ACHD(S)-PC7	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety.Skill to evaluate and manage patients with simple congenital heart disease regarding appropriate timing for surgical interventions.Evaluation Tools: chart-stimulated recall, conference presentation, dire	12 ct obser 12	24IIIIIIvation24	36 I 36	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6 M-ACHD(S)-PC7 M-ACHD(S)-SBP1	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety.Skill to evaluate and manage patients with simple congenital heart disease including appropriate timing for surgical interventions.Evaluation Tools: chart-stimulated recall, conference presentation, dire Systems-Based PracticeCollaborate and coordinate patient care with an adult congenital heart disease center to provide optimal healthcare for appropriate patients with adult congenital heart disease.	12	24 I I I I I I Vation 24 I	36 I 36	Add
M-ACHD(S)-PC1 M-ACHD(S)-PC2 M-ACHD(S)-PC3 M-ACHD(S)-PC4 M-ACHD(S)-PC5 M-ACHD(S)-PC6 M-ACHD(S)-PC7 M-ACHD(S)-SBP1 M-ACHD(S)-SBP1	Patient Care and Procedural SkillSkill to accurately perform a comprehensive history and physical examination in the patient with simple adult congenital heart disease.Skill to appropriately order and integrate the results of imaging with other clinical findings in the evaluation and management of simple adult congenital heart disease patients.Skill to evaluate and manage patients with simple adult congenital heart disease who have undergone reparative intervention.Skill to evaluate and manage the potential cardiovascular complications of pregnant women with simple adult congenital heart disease.Skill to detect the findings of pulmonary arterial hypertension.Skill to appropriately advise patients with simple congenital heart disease regarding exercise, sports participation, and return to play, including the use of testing to evaluate for safety.Skill to evaluate and manage patients with simple congenital heart disease including appropriate timing for surgical interventions.Evaluation Tools: chart-stimulated recall, conference presentation, dire Systems-Based PracticeCollaborate and coordinate patient care with an adult congenital heart disease center to provide optimal healthcare for appropriate patients with adult congenital heart disease.Demonstrate the ability to provide primary cardiac longitudinal care for patients with simple adult congenital heart disease in association with an adult congenital heart disease center.	12 ct obser 12	24 I I I I I I I Z4 I	36 I 36 I	Add

	evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-ACHD(S)-PBL1	Locate, appraise, and assimilate evidence from scientific resources,		Ι		
	such as adult congenital heart disease clinical practice guidelines.				
M-ACHD(S)-PBL2	Identify knowledge and performance gaps and engage in			т	
	opportunities to achieve focused education and performance			1	
	improvement.				
	Evaluation Tools: chart-stimulated recall, direct observation, reflection	and self	f-assess	sment	
	Professionalism	12	24	36	Add
M-ACHD(S)-PROF1	Demonstrate sensitivity and responsiveness to diverse patient	T			
	populations.	1			
M-ACHD(S)-PROF2	Respond to patient needs in a way that supersedes self-interest,				
	including referral of basic adult congenital heart disease patients when	Ι			
	appropriate.				
	Evaluation Tools: direct observation, multisource evaluation				
	Interpersonal and Communication Skills	12	24	36	Add
M-ACHD(S)-ICS1	Effectively educate patients and families across the range of			т	
	socioeconomic and cultural backgrounds about adult congenital heart			1	
	disease management, complications, and lifestyle issues.				
M-ACHD(S)-ICS2	Communicate testing results to physicians and patients in an effective	Ι			
	and timely manner.				
	Evaluation Tools: direct observation, multisource evaluation				

Task Force 14, Table 2. Core Competency Components and Curricular Milestones for Training in Adults With Complex Congenital Heart Disease [Ebstein's anomaly, Tetralogy of Fallot, complex cyanotic congenital heart disease, transposition of the great arteries, single ventricle physiology/Fontan]

	Medical Knowledge	Milestones (Mont		nths)	
		12	24	36	Add
M-ACHD(C)-MK1	Know the basic anatomy and pathophysiology of the cyanotic		Ι		
	congenital heart diseases encountered in adolescents and adults.				
M-ACHD(C)-MK2	Know the natural history of cyanotic congenital heart diseases,		Ι		
	particularly those with Eisenmenger Syndrome.				
M-ACHD(C)-MK3	Know the hematological complications and their management in		I		
	patients with cvanotic heart disease.		-		
M-ACHD(C)-MK4	Know the risks of cardiac arrhythmias and their management in		T		
	patients with adult congenital heart disease.		1		
M-ACHD(C)-MK5	Know the renal complications of evanotic heart disease including				
	medications and procedures with the potential for precipitating renal		Ι		
	failure				
M-ACHD(C)-MK6	Know the other systemic complications of cyanotic heart disease:		Т		
M-ACHD(C)-MIX0	nulmonary orthopedic and neurological		1		
M ACHD(C) MK7	Know the vulnerability these nations have for mortal complications				
WI-ACHD(C)-WIK/	from routing noncordiac surgical procedures and the risks of		Ι		
	intravenous lines without air filters				
	Indevelous lines without all liners.				
MI-ACHD(C)-MIKo	Now the potential for monar complications in cyanotic patients,		Ι		
	particularly mose with puthonary hypertension, from pregnancy of the				
	The strongen-based contraception.			т	
MI-ACHD(C)-MIK9	of superioral repoint and their complications in the adult notions			1	
	Single contribution of the sector of the sec				
M-ACHD(C)-MIKI0	Single ventricle/Fontan: know the basic anatomy and hemodynamics			Ι	
	both in patients with and without surgical repair, and that noncardiac				
	surgery must be performed at an adult congenital heart disease center.				
M-ACHD(C)-MK11	Tetralogy of Fallot: know the basic anatomy, the types of surgical			T	
	repair and the postoperative residua and sequelae including indications			_	
	and timing of reoperation.				
M-ACHD(C)-MK12	Know the anatomy, pathophysiology and associated lesions of			Ι	
	Ebstein's anomaly.				
M-ACHD(C)-MK13	Know the indications for patient referral to an adult congenital heart	I			
	disease center.				
M-ACHD(C)-MK14	Know the appropriate indications for and timing of medical, surgical,				III
	and interventional therapies in all forms of congenital heart disease.				
	<i>Evaluation Tools:</i> chart-stimulated recall, conference presentation, direct	t observ	vation, i	n-traini	ng
	exam				
	Patient Care and Procedural Skills	12	24	36	Add
M-ACHD(C)-PC1	Skill to accurately interpret the physical examination, echocardiogram,			T	
	and electrocardiogram findings in patients with repaired Tetralogy of			1	
	Fallot.				
M-ACHD(C)-PC2	Skill to accurately interpret the physical examination,		т		
	electrocardiogram, and chest X-ray findings in patients with		1		
	Eisenmenger physiology.				
M-ACHD(C)-PC3	Skill to appropriately use electrocardiography, echocardiography, and		T		
	other imaging modalities in diagnosis and management of complex		1		
	adult congenital heart disease.				
M-ACHD(C)-PC4	Skill to assure that female patients have received appropriate			Ι	
	contraceptive advice.				
M-ACHD(C)-PC5	Skill to collaborate with an adult congenital heart disease specialist		т		
	before prescribing medications and procedures with the potential to		1		
	affect hemodynamic stability in patients with cyanotic heart disease.				
M-ACHD(C)-PC6	Skill to urgently refer patients to an adult congenital heart disease		T		
	center in the setting of hemoptysis, transient neurological disturbance,		1		
	syncope, arrhythmia, pregnancy, or anticipated noncardiac surgery.				

			1		1	
M-ACHD(C)-PC7	Skill to interpret echocardiograms, including transesophageal					
	echocardiograms, in all forms of complex congenital heart disease,				III	
	and select other appropriate imaging modalities when necessary					
	(magnetic resonance imaging, computed tomography).			-		
M-ACHD(C)-PC8	Skill to interpret hemodynamic and angiographic data in all types of				111	
	complex congenital heart disease.			-		
M-ACHD(C)-PC9	Skill to appropriately treat complications of complex congenital heart				111	
	disease including nemoptysis, arrnythmias, and neart failure.			-		
M-ACHD(C)-PC10	Skill to evaluate and manage patients with all forms of complex				III	
	congenital heart disease, both operated and unoperated, including					
	appropriate timing for surgical interventions.			-		
M-ACHD(C)-PC11	Skill to assess preconceptual risk and manage patients during				III	
	pregnancy.					
M-ACHD(C)-PC12	Skill to appropriately advise patients with all forms of complex				ш	
	congenital heart disease regarding exercise, sports participation and				111	
	return to play, including the use of testing to evaluate for safety.					
	Evaluation Tools: chart-stimulated recall, conference presentation, direct	t observ	ation			
	Systems-Based Practice	12	24	36	Add	
M-ACHD(C)-SBP1	Establish an ongoing collaborative relationship with an adult					
	congenital heart disease team or center to facilitate prompt access to	I				
	appropriate advice and urgent admission of cyanotic patients when	-				
	necessary.					
M-ACHD(C)-SBP2	Utilize an interdisciplinary team approach with other subspecialists to					
	optimize the care of all patients with moderate and complex congenital				111	
	heart disease.					
	Evaluation Tools: chart-stimulated recall, conference presentation, direct	t observ	ation. 1	multiso	irce	
1						
	evaluation		···· ,			
	evaluation Practice-Based Learning and Improvement	12	24	36	Add	
M-ACHD(C)-PBL1	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and	12	24	36 I	Add	
M-ACHD(C)-PBL1	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized	12	24	36 I	Add	
M-ACHD(C)-PBL1	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them.	12	24	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources,	12	24	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and	12	24 I	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients.	12	24 I	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities	12	24 I	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.	12	24 I	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection	12 and self	24 I	36 I	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection	12 and self	24 I F-assess 24	36 I sment 36	Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism	12 and self	24 I E-assess 24	36 I 	Add III Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations.	12 and self 12 I	24 I -assess 24	36 I sment 36	Add III Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection populations. Demonstrate sensitivity and responsiveness to diverse patient populations.	12 and self 12 I	24 I S-assess 24	36 I 	Add III Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that	12 and self 12 I I	24 I -assess 24	36 I sment 36	Add III Add	
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M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Interpersonal and Communication Skills Effectively educate patients and families across the range of	12 and self 12 I I 12	24 I 	36 I 	Add III Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Interpersonal and Communication Skills Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart	12 and self 12 I I 12	24 I I 24 24	36 I 	Add III Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1	Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart disease management, complications, and lifestyle issues.	12 and self 12 I I 12	24 I I 24 24 24	36 I 	Add III Add Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1 M-ACHD(C)-ICS2	evaluation Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart disease management, complications, and lifestyle issues.	12 and self 12 I I 12	24 I I 24 24 24	36 I 	Add III Add Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1 M-ACHD(C)-ICS2	evaluation Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart disease management, complications, and lifestyle issues. Communicate and work effectively with physicians and other professionals on the healthcare team, including those at an adult	12 and self 12 I I I I I	24 I -assess 24 24	36 I I I I I I	Add III Add Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1 M-ACHD(C)-ICS2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Interpersonal and Communication Skills Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart disease management, complications, and lifestyle issues. Communicate and work effectively with physicians and other professionals on the healthcare team, including those at an adult congenital heart disease center.	12 and self 12 I I I I I I I I I I I I I I	24 I -assess 24 24	36 I I I I I I	Add III Add Add Add	
M-ACHD(C)-PBL1 M-ACHD(C)-PBL2 M-ACHD(C)-PBL3 M-ACHD(C)-PROF1 M-ACHD(C)-PROF2 M-ACHD(C)-ICS1 M-ACHD(C)-ICS2	evaluation Practice-Based Learning and Improvement Identify strengths, deficiencies, and limits in one's knowledge and expertise in cyanotic heart disease and carry out personalized education to address them. Locate, appraise, and assimilate evidence from scientific resources, such as adult congenital heart disease clinical practice guidelines, and apply that knowledge to the management and care of patients. Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement. Evaluation Tools: chart-stimulated recall, direct observation, reflection Professionalism Demonstrate sensitivity and responsiveness to diverse patient populations. Demonstrate a commitment to carry out professional responsibilities, appropriately refer patients, and respond to patient needs in a way that supersedes self-interest. Evaluation Tools: direct observation, multisource evaluation Interpersonal and Communication Skills Effectively educate patients and families across the range of socioeconomic and cultural backgrounds about adult congenital heart disease management, complications, and lifestyle issues. Communicate and work effectively with physicians and other professionals on the healthcare team, including those at an adult congenital heart disease center. Evaluation Tools: direct observation, multisource evaluation	12 and self 12 I I I I I I	24 I -assess 24 24	36 I Sment 36 I I	Add III Add Add Add	

Task Force 15, Table 1. Core Competency Components and Curricular Milestones for Training in Cardiovascular Research and Scholarly Activity

· · ·	Medical Knowledge	Milestones (Mor		ths)	
		12	24	36	Add
M-RES-MK1	Know the roles and functions of DNA, RNA and proteins.			Ι	
M-RES-MK2	Know the principles of genetics, genomics, proteomics, metabolomics and pha			Ι	
M-RES-MK3	Know the principles of epidemiological methods.			Ι	
M-RES-MK4	Know the principles of outcomes evaluation.			Ι	
M-RES-MK5	Know the basic principles of biostatistics.			Ι	
M-RES-MK6	Know the principles underlying hypothesis formation, specific goals definition, hypothesis testability, and statistical power achievable.			Ι	
	<i>Evaluation Tools:</i> global evaluation, in-training exam, multisource evaluation				
	Patient Care and Procedural Skills	12	24	36	Add
M-RES-PC1	Skill to review published research data and assess the adequacy of research design, data analysis, and logical deduction.			Ι	
M-RES-PC2	Skill to integrate appropriately scientific concepts and research advances in routine clinical encounters.		Ι		
M-RES-PC3	Skill to routinely assess the quality of evidence in clinical decisions.		Ι		
M-RES-PC4	Skill to apply principles of biomedical ethics as they pertain to human subject research in the identification of patients as potential research subjects, presentation of alternatives, obtaining informed consent and assuring the security of clinical data used for research.		Ι		
	Systems Based Practice	12	24	36	Add
M-RES-SBP1	Effectively access and utilize national registry data for research	14	I I	50	Auu
	Enteenvery decess and dimite material registry data for research.				
M-RES-SBP2	Know the role of and how to interact with Institutional Review Boards.		Ι		
	Evaluation Tools: direct observation, multisource evaluation				
	Practice-Based Learning and Improvement	12	24	36	Add
M-RES-PBL1	Identify knowledge and performance gaps and engage in opportunities to achieve focused education and performance improvement.		Ι		
M-RES-PBL2	Appropriately integrate new or emerging medical evidence.			Ι	
	<i>Evaluation Tools:</i> multisource evaluation, reflection and self-assessment				
	Professionalism	12	24	36	Add
M-RES-PROF1	Demonstrate sensitivity to patient autonomy and safety in research.	Ι			
M-RES-PROF2	Practice with integrity in the conduct of research, including understanding issues relating to relationships with industry.		Ι		
M-RES-PROF3	Interact respectfully with ancillary and support staff.	Ι			
	Evaluation Tools: conference presentation, direct observation, reflection and s	elf-asse	essment		
	Interpersonal and Communication Skills	12	24	36	Add
M-RES-ICS1	Communicate with fellow trainees and faculty about cardiovascular science and how this might impact clinical care (for example, through journal clubs).		Ι		
M-RES-ICS2	Effectively communicate study results during presentations.		Ι		
	Evaluation Tools: direct observation, multisource evaluation				•

Add = additional months beyond the 3-year cardiovascular fellowship, DNA = deoxyribonucleic acid, and RNA = ribonucleic acid.